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# INSTALLATION/OPERATION MANUAL

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Quantum<sup>TM</sup>  
color

## **Q-650i Series**

LED Home Theater Projectors

Q-650i

Q-650i/CineWide<sup>TM</sup>

Q-650i/CineWide with AutoScope<sup>TM</sup>



**THE WORLD'S FINEST HOME THEATER PRODUCTS<sup>TM</sup>**



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# RuncoCare™ Standard Two Year Limited Warranty

Congratulations on your purchase of a Runco® product! With proper installation, setup and care, you should enjoy many years of unparalleled video performance.

This Limited Warranty is provided free of charge by Runco International, LLC (“Runco”) with the purchase of a covered Runco product. This Limited Warranty is applicable to all Runco projectors, processors, LCD display and plasma display products, with the exception of the following models: XP-103DHD, SC-1 and SC-1a<sup>1</sup>. This Limited Warranty applies to purchases of covered Runco products occurring on or after **June 1, 2011**.

## RuncoCare™ Limited Warranty Coverage

Runco warrants its products to be free from defects in material and workmanship during the warranty period provided below. If a product proves to be defective in material or workmanship during the warranty period, Runco will repair the product, replace the product with a substantially similar new or like-new product, or refund a prorated share of the purchase price (calculated based on the remainder of the warranty period and the then-current, most-recent MSRP<sup>2</sup> of a similar product), if repair or replacement of the product is determined by Runco to not be feasible.

## Length of RuncoCare™ Warranty Period

Runco products are warranted for two (2) years from the date of shipment from Runco. Lamps are warranted six (6) months from the date of shipment or 1000 hours of use, whichever comes first. A replacement lamp is warranted for the remaining portion (if any) of the original warranty period or ninety (90) days from the date it was shipped to you, whichever is longer. All other accessories, which include but are not limited to cables, remotes, carrying cases, lens cap and other peripherals sold with the Runco product, are warranted for ninety (90) days from the date of shipment.

## RuncoCare™ Eligibility

This Limited Warranty is valid only in the country where the Product was originally purchased and for the buyer who originally purchased the covered product from the authorized Runco dealer or distributor. This warranty is not transferable; it is not valid for any subsequent buyer (if any). You may be required to provide proof of purchase in order to receive warranty services.

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1. Runco may update this list of products excluded from this warranty from time to time at Runco’s sole discretion, but updates will not apply on a retroactive basis.
  2. MSRP is defined as the most recent product price listed on Runco’s price list.

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## **RuncoCare™ Standard Claim Procedure**

- In the event of a product defect, please follow the claim procedure provided below:
  - A. Register your product if you have not yet done so. Visit <http://www.runco.com/support/product-registration/> to register the product.
  - B. Contact your original authorized dealer or distributor who sold the product.
  - C. The dealer/distributor will contact Runco Technical Support via email at [support@runco.com](mailto:support@runco.com) or via phone at 1-800-23-RUNCO (1-800-237-8626).
- The dealer/distributor will provide to Runco proof of purchase, serial number, product model number, description of the problem and any troubleshooting steps already attempted.
- Runco's technical support staff will attempt to assist the dealer/distributor in troubleshooting any technical issues that might be causing the product to malfunction. If Runco is unable to resolve the problem through troubleshooting, a Return Material Authorization (RMA) number will be issued for the exchange of the defective product if it is determined that the claim is covered by the warranty. Once an RMA has been created, RMA status is available at [serviceorders@runco.com](mailto:serviceorders@runco.com).
- If an RMA is issued, the dealer or customer will need to return the defective product to the Runco repair depot location specified by the Runco technical support representative. The dealer or customer will need to properly package the defective product in a suitable shipping container consisting of the product only, and not include any accessories (e.g., cables, remotes, carrying cases, lens, lens cap and other peripherals). Boxes may be purchased from a Runco technical support representative.
- The dealer or customer is responsible for paying freight charges and insurance to ship the defective product to the Runco repair depot location. If there are any shipping damages, the dealer or customer will need to address and resolve any shipping damage claims directly with the shipping company.
- Runco will not accept a returned product unless an RMA has been issued by Runco.
- For in-warranty repairs, Runco will pay freight charges to return the repaired/replacement product to the dealer/distributor from the Runco repair depot. For select countries or geographies Runco will ship via an economy express service. Return delivery time and availability may vary based on origin and destination, and Runco is unable to deliver to PO Box and FPO Box addresses.
- Note: in the 48 contiguous United States, other options for on-site service or advance exchange for the product may apply, if you purchased the Runco PremierCare™ Service Plan.

## **What to Include with Your Return**

1. Return only the defective product with the lamp (if applicable).
2. Runco will not be responsible for returning or replacing any accessories (e.g., cables, remotes, carrying cases, lens, lens cap and other peripherals sold with the Runco product) that are returned with the defective product.
3. Repaired or replacement products will be shipped with a lamp (if applicable) but without any accessories.

## **RuncoCare™ Warranty Exclusions**

This Limited Warranty does not include and is limited by the following:

1. Products not purchased from an authorized Runco dealer
2. Rental costs incurred by the customer in the event of product defect or failure
3. Any product with a defaced, modified, or removed serial number

- 
4. Damage, deterioration, or malfunction resulting from:
    - A. Accident, abuse, misuse, neglect, improper ventilation, fire, water, disaster, lightning, or other acts of nature, smoke exposure (cigarette or otherwise), unauthorized product modification (including use of an unauthorized mount), or failure to follow instructions supplied with the product
    - B. Repair or attempted repair by anyone not authorized by Runco
    - C. Any damage to the product due to shipment
    - D. Removal or installation of the product
    - E. Causes external to the product, such as electric power fluctuations or failure
    - F. Use of supplies or parts (including lamps) that are not purchased from Runco or do not meet Runco's specifications
    - G. Normal wear and tear
    - H. Expected lamp degradation and normal decrease in lamp output over a period of time or as the lamp is consumed
    - I. Customer caused defects, including but not limited to, scratched/defaced/altered plastics
    - J. Failure to follow maintenance procedures as outlined in the product's user guide where a schedule is specified for regular cleaning of the product
    - K. Opening the product and/or tampering with internal circuitry
    - L. Products lost, stolen or discarded
    - M. Any damage or dissatisfaction associated with latent images, "burnin," or any other damage determined by Runco to be the result of customer use patterns
    - N. Any other cause, which does not relate to a product defect in material or workmanship
  5. Removal, installation, and set-up service charges are excluded from the warranty.
  6. Black uniformity issues or other LCD issues associated with usage outside the Runco recommended guidelines and specifications for the product.
  7. Bright or dark sub pixels that are characteristic of LCD technology and considered by Runco to be acceptable and within Runco's manufacturing specifications.

Specifically, it is not uncommon for one or more sub pixels to become bright or dark during or after the manufacturing process. A bright sub pixel is one that remains in the on position, and a dark sub pixel is one that appears black or off. The sub pixels are usually hard to see and will not detract from the display quality or usability at normal viewing distance. The following are Runco's criteria for identifying bright or dark sub pixels that would be considered unacceptable: a) the number of bright or dark sub pixels; b) the location of the bright or dark sub pixels; c) the color of the bright sub pixels; and d) the Runco model size. If sub pixels have been identified as unacceptable by Runco the LCD will be deemed faulty and will be replaced if reported within the warranty period.

## **Other Terms and Conditions**

1. If the defective product is not properly packaged and is damaged in transit during its return to Runco, you may be invoiced for either the repair costs, if repairable, or the MSRP of a replacement product and shipping costs incurred by Runco.
2. The repaired or replaced product will assume the remainder of your original product's warranty term or 90 days from the date the repaired or replaced product is shipped, whichever is longer.
3. If a replacement product is sent, the replacement becomes the property of the customer and the defective product becomes the property of Runco.

## **RuncoCare™ Extended Service Options**

Runco offers extended and expanded service plans. For information on additional product protection, please ask your authorized Runco dealer, email [serviceorders@runco.com](mailto:serviceorders@runco.com) or call (toll free) (800) 23-RUNCO (800-237-8626).

## **Exclusion of Implied Warranties**

RUNCO PROVIDES NO WARRANTIES, EXPRESS OR IMPLIED, EXCEPT THOSE EXPRESSLY PROVIDED IN THIS DOCUMENT. RUNCO EXPRESSLY DISCLAIMS AND EXCLUDES ALL OTHER WARRANTIES, INCLUDING THE IMPLIED WARRANTIES OF TITLE, NONINFRINGEMENT, MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

## **Limitation of Liability; Exclusion of Damages**

RUNCO'S MAXIMUM AGGREGATE LIABILITY IS LIMITED TO THE COST OF REPAIR, REPLACEMENT OR REFUND OF THE PRODUCT.

RUNCO WILL NOT BE LIABLE FOR DAMAGE TO OTHER PROPERTY OR FOR DAMAGES BASED UPON INCONVENIENCE, LOSS OF USE OF THE PRODUCT, LOSS OF TIME, LOSS OF PROFITS, LOSS OF BUSINESS OPPORTUNITY, LOSS OF GOODWILL, INTERFERENCE WITH BUSINESS RELATIONSHIPS, OR OTHER COMMERCIAL OR FINANCIAL LOSS, EVEN IF RUNCO IS AWARE OF THE POSSIBILITY OF SUCH DAMAGES AND EVEN IF A REMEDY HAS FAILED OF ITS ESSENTIAL PURPOSE.

RUNCO WILL NOT BE LIABLE FOR ANY CONSEQUENTIAL, INCIDENTAL, INDIRECT, EXEMPLARY, SPECIAL, PUNITIVE OR ANY OTHER TYPE OF DAMAGES, WHETHER THE CLAIM IS BASED ON CONTRACT, TORT, PRODUCT LIABILITY, NEGLIGENCE, STRICT LIABILITY OR ANY OTHER LEGAL OR EQUITABLE THEORY.

RUNCO WILL NOT BE LIABLE FOR ANY CLAIM AGAINST THE CUSTOMER BY ANY OTHER PARTY.

## **Effect of Local Law**

This Limited Warranty gives you specific legal rights, and you may have other rights, which vary from locality to locality. Some localities do not allow limitations on implied warranties and/or do not allow the exclusion of incidental or consequential damages, so the above limitations and exclusions may not apply to you.

## **COPYRIGHT AND TRADEMARKS:**

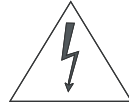
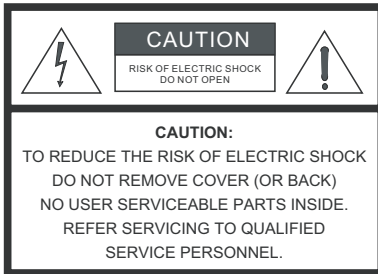
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Runco Products are manufactured under one or more of the following patents: US. Patent 6755540 and Other Patents Pending.

# Important Safety Instructions

Thank you for your purchase of this quality Runco video product! For the best performance, please read this manual carefully as it is your guide through the menus and operation.



## WARNING

This symbol is intended to alert the user to the presence of uninsulated “dangerous voltage” within the product’s enclosure that may be of sufficient magnitude to constitute a risk of electric shock.



This symbol is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

1. Read these instructions.
2. Keep these instructions.
3. Heed all warnings.
4. Follow all instructions.
5. Do not use this apparatus near water.
6. Clean only with a dry cloth.
7. Do not block any of the ventilation openings. Install in accordance with the manufacturer’s instructions.
8. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
9. Do not defeat the safety purpose of the polarized or grounding type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong is provided for your safety. When the provided plug does not fit into your outlet, consult an electrician for the replacement of the obsolete outlet.
10. Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles and the point where they exit from the apparatus.
11. Only use the attachments/accessories specified by the manufacturer.
12. Use only with a cart, stand, tripod, bracket or table specified by the manufacturer or sold with the apparatus. When a cart is used, use caution when moving the cart/apparatus to avoid injury from tip-over.
13. Unplug this apparatus during lightning storms or when unused for long periods of time.
14. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
15. The +12V trigger only outputs 12Vdc signal for triggering. Do not connect to any other power input or output. This could cause damage to this unit.
16. Keep the packing material in case the equipment should ever need to be shipped.
17. Never look directly into the lens when the lamp is on.



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# Compliance Information

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## DECLARATION OF CONFORMITY:

Manufacturer's Name: Runco International, LLC

Manufacturer's Address: 1195 NW Compton Drive, Beaverton, OR 97006-1992

hereby declares that the Products' Model Numbers:

Q-650i, Q-650i/CineWide and Q-650i/CineWide with AutoScope

conform with the provisions of:

Council Directive 2004/108/EC on Electromagnetic Compatibility;

EN 55022 "Limits and methods of measurements of radio interference characteristics of information technology equipment" 1998;

EN 55024 "Limits and methods of measurements of immunity characteristics of information technology equipment" 1998;

Including:

- EN 61000-4-2 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 2: Electrostatic discharge immunity test"
- EN 61000-4-3 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 3: Radiated, Radio-Frequency, Electromagnetic Field Immunity Test"
- EN 61000-4-4 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 4: Electrical fast transient/burst immunity test"
- EN 61000-4-5 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 5: Surge immunity test"
- EN 61000-4-6 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 6: Conducted disturbances induced by radio-frequency fields immunity test"
- EN 61000-4-8 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 8: Conducted disturbances induced by power frequency magnetic fields immunity test"
- EN 61000-4-11 "Electromagnetic compatibility (EMC) Part 4: Testing and measurement techniques Section 11: Voltage dips, short interruptions and voltage variations immunity tests"

And:

- EN 61000-3-2 "Electromagnetic compatibility (EMC) Part 3, Section 2: Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)" 2000;
- EN 61000-3-3 "Electromagnetic compatibility (EMC) Part 3, Section 3: Limitations of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current up to and including 16 A and not subject to conditional connection" 1995;

Council Directive 2006/95/EC and amended by M1 and C1 on Low Voltage Equipment Safety;

EN 60950 "Safety of information technology equipment, including electrical business equipment"

The Technical Construction file required by this Directive is maintained at the corporate headquarters of Runco International, LLC, located at 1195 NW Compton Drive, Beaverton, OR 97006-1992.

Date of Declaration: August 2011



## FCC PART 15:

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

## INDUSTRY CANADA (ICES-003):

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

## PRODUCT DISPOSAL:

The Product contains small amounts of tin, lead and/or mercury. Disposal of these materials may be regulated due to environmental considerations.

## IMPORTANT RECYCLE INSTRUCTIONS



Lamp(s) inside this product contain mercury. This product may contain other electronic waste that can be hazardous if not disposed of properly. Recycle or dispose in accordance with local, state, or federal Laws.

For more information, contact the Electronic Industries Alliance at [WWW.EIAE.ORG](http://WWW.EIAE.ORG).

For lamp specific disposal information check [WWW.LAMPRECYCLE.ORG](http://WWW.LAMPRECYCLE.ORG).

## DISPOSAL OF OLD ELECTRICAL AND ELECTRONIC EQUIPMENT (Applicable throughout the European Union and other European countries with separate collection programs)



This symbol found on your product or on its packaging, indicates that this product should not be treated as household waste when you wish to dispose of it. Instead, it should be handed over to an applicable collection point for the recycling of electrical and electronic equipment. By ensuring this product is disposed of correctly, you will help prevent potential negative consequences to the environment and human health, which could otherwise be caused by inappropriate disposal of this product. The recycling of materials will help to conserve natural resources. This symbol is only valid in the European Union. If you wish to discard this product, please contact your local authorities or dealer and ask for the correct method of disposal.

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**Notes:**

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# 1. Introduction

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This Owner's Manual describes how to install, set up and operate a Runco Q750i Series LED Home Theater Projector.

Throughout this manual, the Runco Q-650i Series LED Home Theater Projectors are referred to collectively as the "Q-650i." Except where noted, the features and functions described in this manual are common to all versions of this product.

Runco has prepared this manual to help home theater installers and end users get the most out of the Q-650i.

Runco has made every effort to ensure that this manual is accurate as of the date it was printed. However, because of ongoing product improvements and customer feedback, it may require updating from time to time. You can always find the latest version of this and other Runco product manuals on-line, at [www.Runco.com](http://www.Runco.com).

Runco welcomes your comments about this manual. Send them to [info@runco.com](mailto:info@runco.com).

**Text Conventions:** The following conventions are used in this manual, in order to clarify the information and instructions provided:

- Remote and built-in keypad button identifiers are set in upper-case bold type; for example, "Press **EXIT** to return to the previous menu."
- Computer input (commands you type) and output (responses that appear on-screen) is shown in monospace (fixed-width) type; for example: "To change the aspect ratio to Letterbox, type `op aspect = 1 <Enter>`."
- All keys with functional names are initial-capped, set in bold type and enclosed in angle brackets. These keys are the following: **<Enter>**, **<Spacebar>**, **<Control>**, **<Esc>** and **<Tab>**.
- **<Enter>** indicates that you may press either the RETURN or ENTER key on your keyboard if it has both keys.

In addition to these conventions, underlining, boldface and/or italics are occasionally used to highlight important information, as in this example:



*A carriage return **must** be used after each command or string.*

---

## 1.1 About This Manual

### ◀ Target Audience

### ◀ If You Have Comments About This Manual...

### ◀ Textual and Graphic Conventions

**Graphic Conventions:** These symbols appear in numerous places throughout the manual, to emphasize points that you must keep in mind to avoid problems with your equipment or injury:



**Tip**

*TIPS highlight time-saving short cuts and helpful guidelines for using certain features.*



**Note**

*NOTES emphasize text with unusual importance or special significance. They also provide supplemental information.*



**Caution**

*CAUTIONS alert users that a given action or omitted action can degrade performance or cause a malfunction.*



**WARNING**

*WARNINGS appear when a given action or omitted action can result in damage to the equipment, or possible non-fatal injury to the user.*



**DANGER!**

*DANGER appears when a given action can cause severe injury or death.*

## 1.2 Using This Manual

Use the following table to locate the specific information you need in this manual.

<b>If you need...</b>	<b>... Turn to page:</b>
Information about obtaining service	iv
General information about the Q-650i Series LED Home Theater Projector	3
Installation instructions	11
First-time configuration instructions	35
Advanced configuration instructions	55
Troubleshooting tips	71
Specifications for the Q-650i Series LED Home Theater Projectors	85

Integrating Runco's award-winning controller/processor technology for flawless images from any source, the Q-650i sets new standards in projection with Runco's game-changing InfiniLight™ LED lampless technology, Personal Color Equalizer and Runco SmartColor.

Runco's revolutionary QuantumColor™ projectors pair energy-saving LED technology with proprietary Runco engineering to create unsurpassed performance and unrivaled customization. The Runco QuantumColor Q-750i maximizes the benefits of Runco's new InfiniLight™ lampless LED illumination technology to provide an infinite light source that creates an energy-efficient projector with the widest color gamut ever available in home theater projection.

But simply creating a projector platform with lampless technology and the largest color gamut isn't enough. Harnessing its incredible color options, Runco introduces its revolutionary new Personal Color Equalizer™, which allows color adjustment that includes those exactly defined by the cinematographer and the color preferences of each individual viewer for each source. Proprietary Runco Smart Color (RSC™) provides a hue compensation curve and gamut mapping that allows for lifelike, accurate flesh tones while increasing color saturation, without sacrificing the purity of other colors.

In addition to Runco's proprietary InfiniLight, Personal Color Equalizer and Runco Smart Color, the Q-750i can also be paired with Runco's award-winning CineWide™ and CineWide with AutoScope™ technology. CineWide provides uncompromised widescreen reproduction of movies originally filmed in the CinemaScope™ 2:35:1 format. It maintains constant vertical height on the screen just as in a movie theater. When a viewer transitions from 1.78:1 (16:9) program material to superwide 2.35:1, the image simply gets wider while full screen height is maintained, eliminating useless black bars on the top and bottom of the screen.

Runco CineWide is achieved through Runco's ingenious combination of software, electronics and precision anamorphic optics. With Runco CineWide, the projection system is able to use the full pixel array, thereby producing a 2.35:1 image with enhanced resolution and increased brightness. No resolution or image area is lost to those black bars that contain no picture information. CineWide with AutoScope provides a motorized, remote-controlled anamorphic lens mechanism.

**Note**

*CineWide requires the use of a 2.35:1 (or similar aspect ratio), "superwide" format screen.*

Discrete IR and RS-232 control make custom installation seamless, while discrete source and aspect ratio selection accommodate any automation control system.

---

## 1.3 Description, Features and Benefits

- Key Features and Benefits** ➤ The Q-650i offers these key features and benefits:
- Full-HD Native Resolution: 1920 x 1080 (16:9 Native Aspect Ratio)
  - InfiniLight™ lampless LED illumination technology provides an infinite, energy-efficient light source
  - Picture in Picture function allows you to display two inputs on the screen at the same time
  - Two (2) HDMI Inputs with High-bandwidth Digital Content Protection (HDCP)
  - HDTV Compatible
  - ConstantContrast™ provides automatic, real-time LED drive adjustment, maximizing contrast ratio and dynamic range especially in dark scenes

- Parts List** ➤ Your Q-650i is shipped with the following items. If any items are missing or damaged, please contact your Runco dealer or Runco Customer Service at (800) 23-RUNCO.
- Q-650i Series LED Home Theater Projector
  - Remote Control Unit and two (2), AAA-size batteries
  - AC Power Cords (North America, Europe, United Kingdom), 8.2 feet (2.5 meters)
  - 5.0-mm Hex wrench (for lens shift adjustment)
  - Q-650i Series Installation/Operation Manual (this document)
  - Q-650i Series Quick Setup Guide

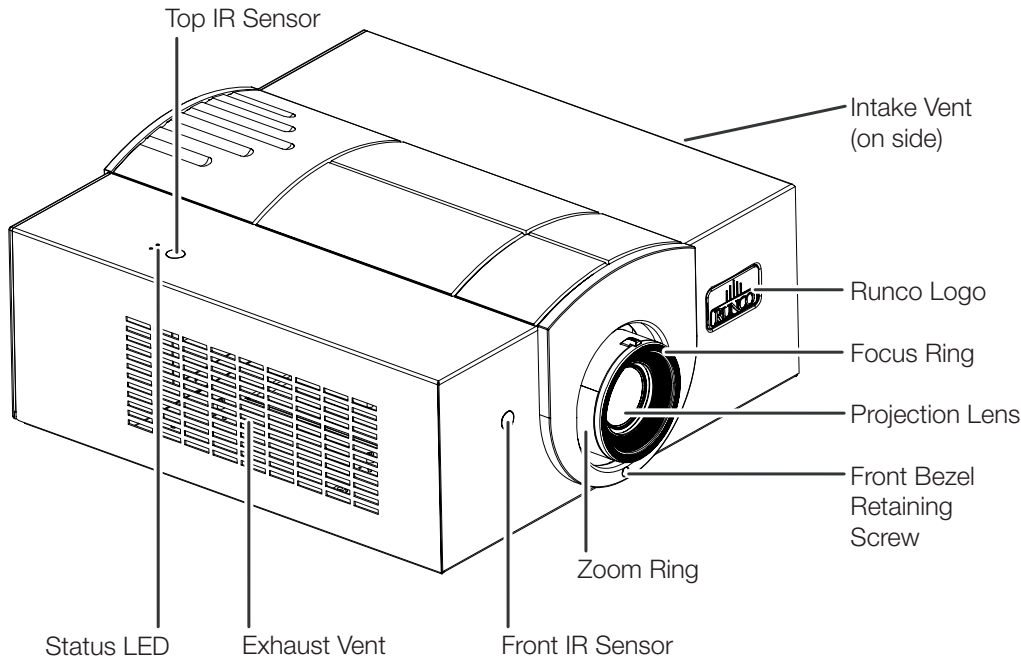
**Optional Accessories:**

- Ceiling mount kit (part number 956-0074-00)
- Short-throw primary lens, 1.56:1-1.86:1
- CineWide™ technology (fixed, secondary anamorphic lens)
- CineWide™ with AutoScope™ system (secondary anamorphic lens and motorized mount)

## 2. Controls and Functions

Figure 2-1 shows the key Q-650i components.

### 2.1 Q-650i at a Glance



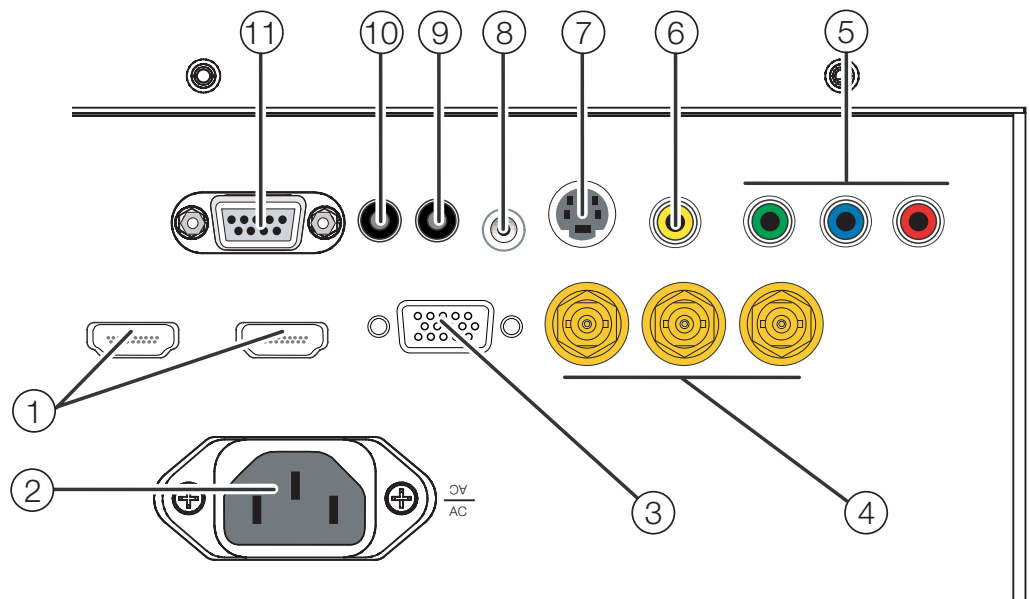
**Figure 2-1. Q-650i Front/Side/Top View**

- **TOP IR SENSOR**  
Receives infrared signals from the remote control unit.
- **INTAKE VENT**  
Internal fans draw cool air into the projector through this vent.
- **RUNCO LOGO**  
The logo can be rotated to match the projector orientation: inverted (ceiling-mounted) or upright. To rotate the logo, grip it at the sides, pull it away from the projector and rotate it 180 degrees.
- **FOCUS RING**  
Rotate this to focus the projected image.
- **PROJECTION LENS**  
Available in two versions: standard throw range (1.85:1 to 2.40:1) and short throw range (1.56:1 to 1.86:1).
- **FRONT BEZEL RETAINING SCREW**  
Loosen this screw to allow removal of the decorative front bezel, which provides access to the lens shift controls (refer to **Lens Shift** on page 34).
- **ZOOM RING**  
Rotate this to change the projected image size.

- **FRONT IR SENSOR**  
Receives infrared signals from the remote control unit.
- **EXHAUST VENT**  
Warm air exits the projector through this vent. Ensure that it is not blocked.
- **STATUS LED**  
Indicates projector status as follows:
  - Solid green = AC power present, ready to turn on.
  - Flashing green = Projector is initializing; keypad functions not allowed.
  - Off = **Normal operation.**
  - Flashing red = Over temperature, user intervention (clear vents, turn on AC) may fix problem
  - Solid red = Error that requires servicing (fan failure, Power-on Self-Test (POST) failure).

## 2.2 Q-650i Rear Panel

Figure 2-2 shows the Q-650i rear panel.



**Figure 2-2. Q-650i Rear Panel**

1. **HDMI 1 (Digital)**  
**HDMI 2 (Digital)**  
HDCP-compliant digital video inputs for connecting an HDMI or DVI source.
2. **POWER INPUT (100 to 240 VAC)**  
Connect the Q-650i to power here.
3. **RGB**  
Provides a standard, 15-pin VGA-style connection to either an RGB or component high-definition source, or to a personal computer. The Q-650i automatically detects the input signal resolution.
4. **COMPONENT 2**  
Three BNCs for connecting component (YPbPr) video sources.

- 
5. **COMPONENT 1/SCART (RCA connectors)**  
Standard- or high-definition (480i/480p/576i/576p/720p/1080i/1080p) Component (YPrPb) input for connecting a DVD/HD-DVD/BD player, HD set-top box or other SD/HD source. Also provides RGB input for SCART RGBS sources.
  6. **VIDEO**  
Standard composite video input for connecting a VCR, camcorder or other composite video source. Also provides composite sync input for SCART RGBS sources.
  7. **S-VIDEO**  
A standard S-Video input for connecting a DVD player, satellite receiver or Super VHS (S-VHS) VCR.
  8. **IR INPUT**  
Wired input from a Niles- or Xantech-compatible, infrared (IR) repeater system.
  9. **TRIGGER 2 (3.5-mm, mini phono jack)**  
Provides 12 (+/- 1.5) volt switched output for screen relays with 250mA current capacity and short protection.
  10. **TRIGGER 1**  
Provides 12 (+/- 1.5) volt switched output for screen relays with 250mA current capacity and short protection.
  11. **RS-232**  
A female, 9-pin D-sub connector for interfacing with a PC or home theater automation/control system.

## 2.3 Q-650i Remote Control

Figure 2-3 shows the Q-650i remote control, and the paragraphs that follow describe its functionality.

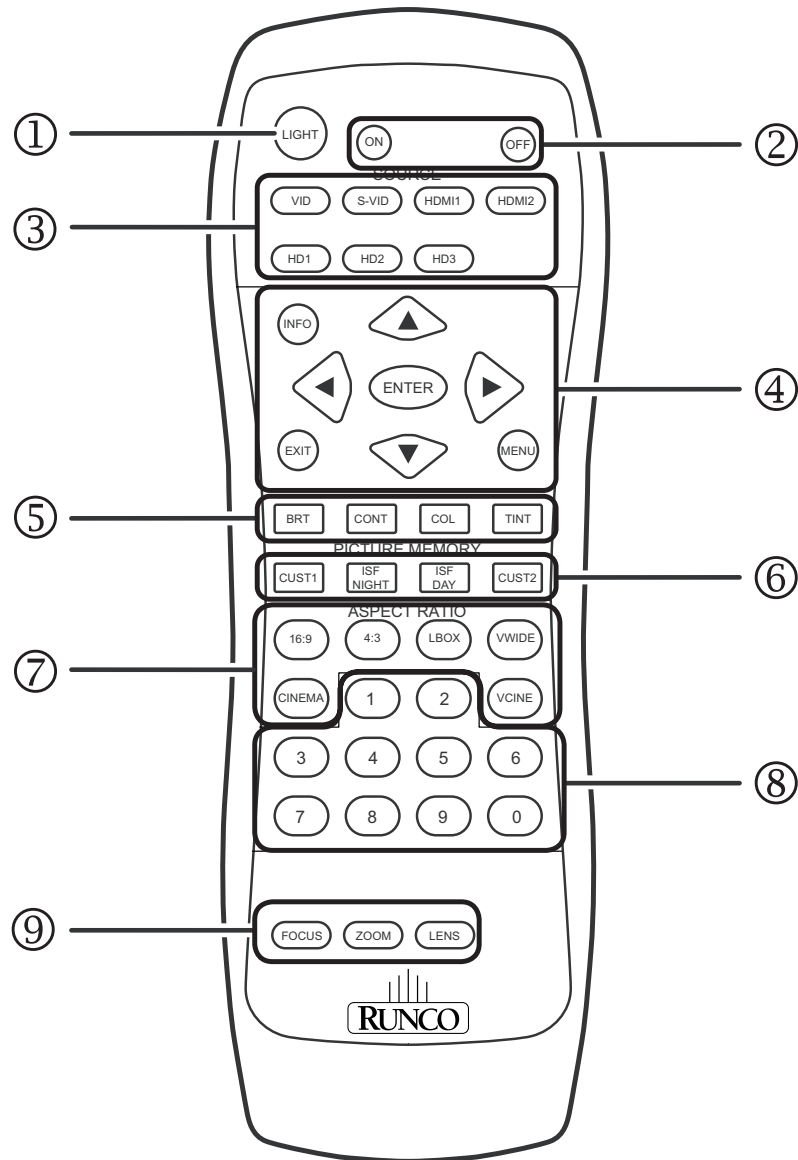


Figure 2-3. Q-650i Remote Control



---

**1. LIGHT**

Press to illuminate the buttons.

**2. ON / OFF**

Use these buttons to turn the projector on or off.

**3. Source Selection Buttons:****VID**

Press to select Composite video input as the source.

**S-VID (S-Video)**

Press to select the S-Video input as the source.

**HDMI 1 / HDMI 2**

Press to select an HDMI input.

**HD 1 / HD 2 / HD 3**

Press to select the "HD 1," "HD 2" or "HD 3" video input as the source. By default, these buttons are assigned to the COMPONENT 1, COMPONENT 2 and RGB video inputs respectively; however, you can re-assign these buttons to other inputs. For more information, refer to **HD 1 Key / HD 2 Key / HD 3 Key** on page 66.

**4. INFO**

Press to display input signal and product information.

**Cursor Keys (▲, ◀, ▼, ▶)**

Use these buttons to select items or settings, adjust settings or switch display patterns.

**EXIT**

Press to save menu item setting(s), exit the current menu and return to the previous one.

**ENTER**

Press to select a highlighted menu item or confirm a changed setting.

**MENU**

Press this button to show or hide the OSD controls.

**5. Picture Adjustment Buttons:****BRT (Brightness)**

Press to adjust black level.

**CONT (Contrast)**

Press to adjust white level.

**COL (Color)**

Press to adjust color intensity.

**TNT (Tint)**

Press to adjust color hues.

6. **Memory Preset Buttons:**

**CUST1**

Press to recall settings for the current input from the "Custom 1" memory preset.

**ISF NIGHT**

Press to recall settings for the current input from the "ISF Night" memory preset.

**ISF DAY**

Press to recall settings for the current input from the "ISF Day" memory preset.

**CUST2**

Press to recall settings for the current input from the "Custom 2" memory preset.

7. **Aspect Ratio Selection Buttons**

Use these buttons to select an aspect ratio directly, as follows:

**16:9**

For viewing 16:9 DVDs or HDTV programs in their native aspect ratio.

**4:3**

Scales the input signal to fit 4:3 display mode in the center of the screen.

**LBOX (Letterbox)**

For viewing LaserDisc movies or non-anamorphic DVDs on a 16:9 screen.

**VWIDE (VirtualWide)**

Enlarges a 4:3 image horizontally in a NON-linear fashion to fit 16:9 full screen display.

**CINEMA**

For viewing 2.35:1 source material.

**VCINE (Virtual Cinema – CineWide-equipped projectors only)**

Selects the Virtual Cinema aspect ratio, used for viewing 16:9 source material on a 2.35:1 screen.

8. **0 - 9**

Use these keys to enter numeric characters.

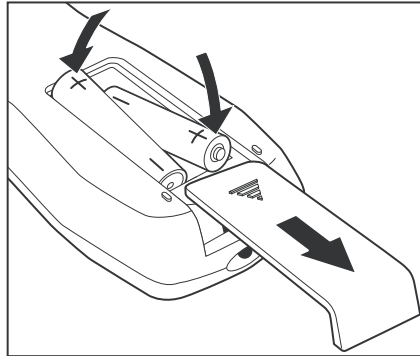
9. **FOCUS / ZOOM / LENS**

Not used with this projector.

# 3. Installation

To install batteries in the remote control:

1. Slide the battery compartment cover in the direction of the arrow to remove it.
2. Install two AAA batteries with the correct polarity.
3. Replace the cover.



- Make sure that the battery polarities are correct when installing the batteries.
- Do not mix an old battery with a new one or different types of batteries.
- If you will not use the remote control for a long time, remove the batteries to avoid damage from battery leakage.
- Make sure that there is nothing obstructing the infrared beam between the remote control and the IR receiver on the projector.
- If the effective range of the remote control decreases, or it stops working, replace the batteries with new ones.
- The remote control may fail to operate if the infrared remote sensor is exposed to bright sunlight or fluorescent lighting.
- Ambient conditions may possibly impede the operation of the remote control. If this happens, point the remote control at the projector, and repeat the operation.

## 3.1 Remote Control

### ◀ Notes on Batteries

### ◀ Notes on Remote Control Operation

## 3.2 Quick Setup

Table 3-1 gives a quick overview of the Q-650i installation process. The sections following this one provide detailed instructions.



**Note**

*Installation should be performed by a qualified custom video installation specialist.*

**Table 3-1. Installation Overview**

Step	Procedure	For Details, Refer to page...
1	Choose a location for the projector	13
2	<b>If installing a CineWide-equipped projector:</b> Install AutoScope lens motor or fixed CineWide base plate (optional)	19
3	Mount the projector	26
4	Connect signal sources to the Q-650i	27
5	Connect external controller to RS-232 port (optional)	31
6	Connect 12-volt trigger output to AutoScope lens motor or other equipment (optional)	32
7	Apply power to the projector	33
8	Primary lens adjustments: focus, projected image size (zoom) and position (shift)	16, 34
9	Change the OSD Language (optional)	35
10	For rear-screen and/or ceiling-mount installations, select the proper picture orientation	35
11	Install CineWide anamorphic lens (optional)	36
12	CineWide lens adjustments: position, pitch (angle), geometry and focus	38
13	Projector calibration: adjust the following <b>for each input</b> ; save settings when finished: <ul style="list-style-type: none"> <li>• Aspect ratio</li> <li>• Brightness</li> <li>• Contrast</li> <li>• Color level</li> <li>• Tint</li> <li>• Input position</li> </ul>	46

Proper installation of your projector will ensure the quality of your display. Whether you are installing a projector temporarily or permanently, you should take the following into account to ensure your projector performs optimally.

Choose the installation type that best suits your needs: front or rear screen, floor mount or inverted mount. Table 3-2 compares these various installation methods.

**Table 3-2. Projector Installation Options**

Advantages	Considerations
<b>Front Screen, Floor Mount Installation</b>	
<ul style="list-style-type: none"> <li>• Easy to set up</li> <li>• Can be moved or changed quickly</li> <li>• Easy to access</li> </ul>	<ul style="list-style-type: none"> <li>• Shares floor space with audience</li> </ul>
<b>Front Screen, Inverted Mount (ceiling) Installation</b>	
<ul style="list-style-type: none"> <li>• Does not take up audience space</li> <li>• Projector is unobtrusive</li> <li>• Projector cannot be accidentally moved</li> </ul>	<ul style="list-style-type: none"> <li>• Installation is more permanent</li> <li>• Projector access is more difficult</li> </ul>
<b>Rear Screen, Floor Mount Installation</b>	
<ul style="list-style-type: none"> <li>• Projector is completely hidden</li> <li>• Projector is easily accessed</li> <li>• Usually good ambient light rejection</li> </ul>	<ul style="list-style-type: none"> <li>• Requires separate room</li> <li>• Installation cost is usually higher</li> </ul>
<b>Rear Screen, Inverted Mount (ceiling) Installation</b>	
<ul style="list-style-type: none"> <li>• Projector is completely hidden</li> <li>• Usually good ambient light rejection</li> </ul>	<ul style="list-style-type: none"> <li>• Requires separate room</li> <li>• Installation cost is usually higher</li> </ul>
<b>Rear Screen, Floor Mount with Mirror</b>	
<ul style="list-style-type: none"> <li>• Projector is completely hidden</li> <li>• Usually good ambient light rejection</li> <li>• Requires less space behind screen than other rear screen installations</li> </ul>	<ul style="list-style-type: none"> <li>• Requires separate room</li> <li>• Installation cost is usually higher</li> </ul>

In general, minimize or eliminate light sources directed at the screen. Contrast ratio in your images will be noticeably reduced if light directly strikes the screen, such as when a shaft of light from a window or floodlight falls on the image. Images may then appear washed out and less vibrant.

### 3.3 Installation Considerations

#### ◀ Installation Type

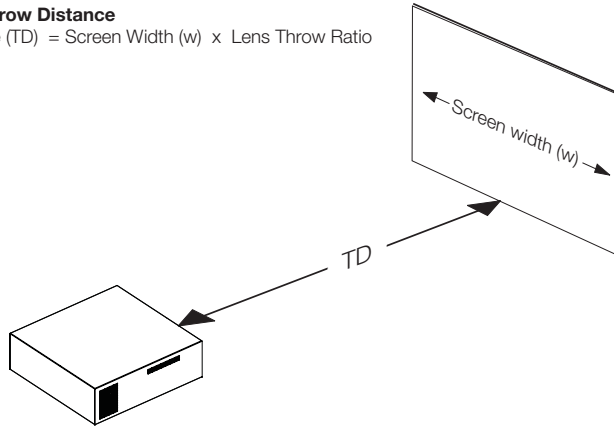
#### ◀ Ambient Light

**Throw Distance** ➤ Throw distance is the distance measured from the front of the projector to the screen. This is an important calculation in any projector installation as it determines whether or not you have enough room to install your projector with a desired screen size and if your image will be the right size for your screen.

You can quickly estimate the throw distance by taking the width of the screen and multiplying it by the lens throw ratio; see Figure 3-1. The result of this calculation tells you roughly how far back the projector should be positioned from the screen in order to project a focused image large enough to fill the screen.

**Estimating Throw Distance**

Throw Distance (TD) = Screen Width (w) x Lens Throw Ratio



**Figure 3-1. Estimating Throw Distance**

Table 3-3 gives the throw ratios for the Q-750i Series.

**Table 3-3. Throw Ratios for the Q-650i Series**

Projector Model	Throw Ratio with Primary Lens Only	Throw Range in inches, with 72.6x40.8-inch (1.78:1) Screen		Throw Ratio with Primary Lens and Anamorphic Lens	Throw Range in inches, with 96x40.8-inch (2.35:1) Screen	
		Minimum	Maximum		Minimum	Maximum
Standard Q-650i	1.85 – 2.40	134.31	174.24		(n/a)	
Standard Q-650i with Optik A Primary Lens	1.56 – 1.86	113.26	135.03		(n/a)	
Q-650i/CineWide (Rainier II Anamorphic Lens)		(n/a)		1.52 – 1.80	145.92	172.80
Q-650i/CineWide with AutoScope (Rainier II Anamorphic Lens)	1.85 – 2.40	134.31	174.24	1.52 – 1.80	145.92	172.80
Q-650i/CineWide (McKinley Anamorphic Lens)		(n/a)		1.39 – 1.80	133.44	172.80

**Table 3-3. Throw Ratios for the Q-650i Series (continued)**

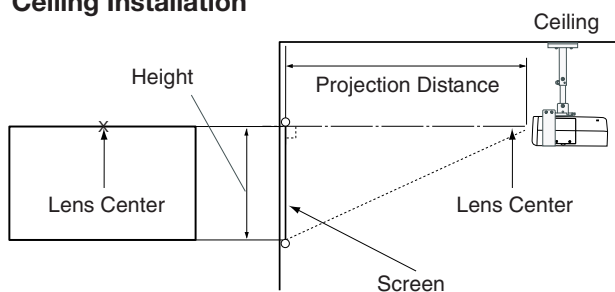
Projector Model	Throw Ratio with Primary Lens Only	Throw Range in inches, with 72.6x40.8-inch (1.78:1) Screen		Throw Ratio with Primary Lens and Anamorphic Lens	Throw Range in inches, with 96x40.8-inch (2.35:1) Screen	
		Minimum	Maximum		Minimum	Maximum
Q-650i/CineWide (Optik A Primary Lens and McKinley Anamorphic Lens)		(n/a)		1.17 – 1.40	112.32	134.40
Q-650i/CineWide with AutoScope (McKinley Anamorphic Lens)	1.85 – 2.40	134.31	174.24	1.39 – 1.80	133.44	172.80
Q-650i/CineWide with AutoScope (Optik A Primary Lens and McKinley Anamorphic Lens)	1.56 – 1.86	113.26	135.03	1.17 – 1.40	112.32	134.40

Proper placement of the projector relative to the screen will yield a rectangular, perfectly-centered image that completely fills the screen.

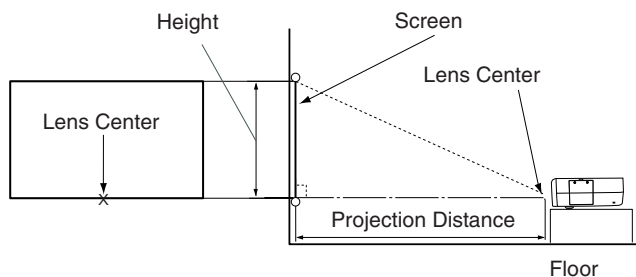
◀ **Vertical and Horizontal Position**

Ideally, the projector should be positioned perpendicular to the screen and in such a way that the lens center is aligned with either the top or bottom edge of the screen area, and centered horizontally. See Figure 3-2.

**Ceiling Installation**



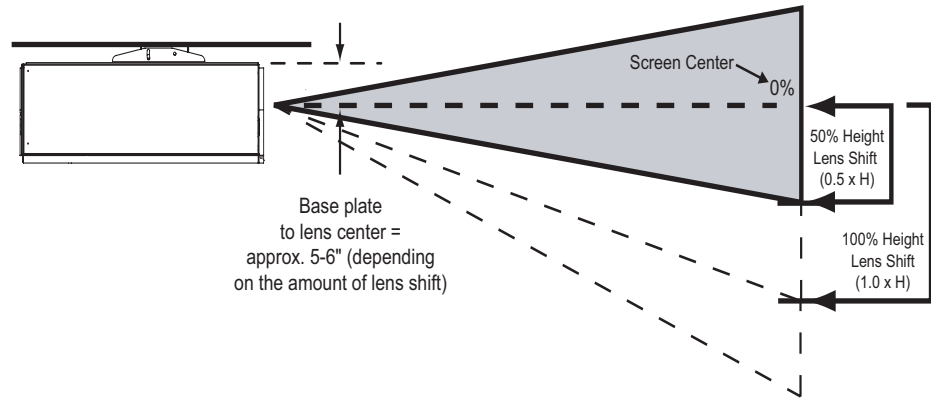
**Floor Installation**



**Figure 3-2. Projector Placement**

### Vertical and Horizontal Lens Shift

You can use the lens shift controls on the projector remote to center the image on the screen. Lens shift is generally expressed as a percentage of the screen height or width, as shown in Figure 3-3 and Figure 3-4.



**Note:** This is a general example of lens shift. Lenses vary in their shift capabilities. **No particular lens or projector is used in this example.**

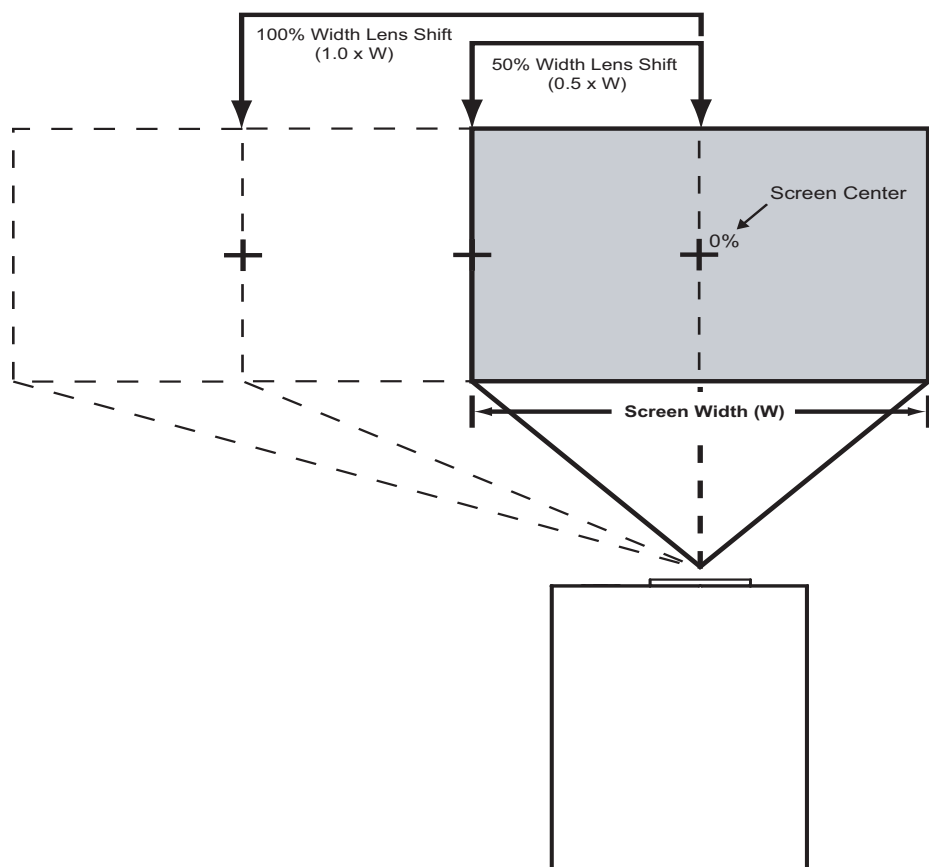
**Figure 3-3. Vertical Lens Shift (Example Only)**

**Vertical Lens Shift (Standard Q-650i):** The Q-650i provides up to 60% of vertical lens shift up or down. For example, with a 100 x 56 inch (1.78:1) screen, you can shift the image up to 33.60 inches (0.85 meters) above or below the screen center.

**Vertical Lens Shift (Q-650i/CineWide or Q-650i/CineWide with AutoScope):** The Q-650i provides up to 25% of upward vertical lens shift and up to 60% of downward vertical lens shift. For example, with a 100 x 56 inch (1.78:1) screen, you can shift the image up to 14.00 inches (0.36 meters) above or 33.60 inches (0.85 meters) below the screen center.

**Horizontal Lens Shift:** The Q-650i provides up to 12.5% of horizontal lens shift left or right. For example, with a 100 x 56 inch (1.78:1) screen, you can shift the image up to 12.50 inches (0.32 meters) left or right of the screen center.





**Note:** This is a general example of lens shift. Lenses vary in their shift capabilities. **No particular lens or projector is used in this example.**

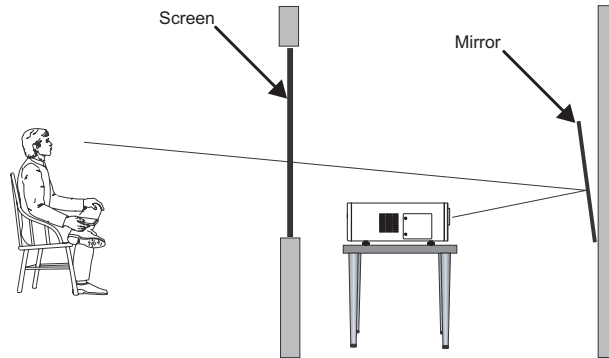
**Figure 3-4. Horizontal Lens Shift (Example Only)**



**Note**

1. With no vertical or horizontal lens shift, the lens center and screen center are aligned with each other.
2. Vertical shift limits are percentages of the screen height. Horizontal shift limits are percentages of the screen width.
3. **Vertical lens shift figures are for ceiling mount configurations.** For floor installations (where the projector is upright), reverse the up/down vertical lens shift percentages.

**Folded Optics** ➤ In rear-projection applications where space behind the projector is limited, a mirror may be used to fold the optical path, as shown in Figure 3-5. The position of the projector and mirror must be accurately set.



**Figure 3-5. Folded Optics**



**Tip**

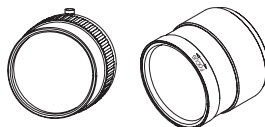
*For best performance, always use “first-surface” mirrors in your rear-projection installation (as opposed to conventional, “second-surface” mirrors with the reflective surface behind a transparent substrate such as glass or acrylic).*

*First-surface mirrors provide a strict reflection without the “ghosting” effect seen with a second surface mirror, where a faint secondary reflection could be observed coming from the front surface of the glass.*

- Other Considerations** ➤ Other considerations and tips that can help improve your installation:
- Keep the ambient temperature constant and below 35°C (95°F). Keep the projector away from heating and/or air conditioning vents. Changes in temperature may cause drifts in the projector circuitry, which may affect performance.
  - Keep the projector away from devices that radiate electromagnetic energy such as motors and transformers. Common sources of these include slide projectors, speakers, power amplifiers and elevators.

If you are installing a standard (non-CineWide) Q-650i, skip this step and proceed with **Mounting the Q-650i** (page 26).

If you are installing a Q-650i/CineWide projector equipped with a **cylindrical** (Rainier II or McKinley) anamorphic lens, proceed with **Installing the Fixed CineWide Base Plate** (page 24).



If you are installing a Q-650i/CineWide with AutoScope, proceed as follows to install the AutoScope lens motor.

**Note**

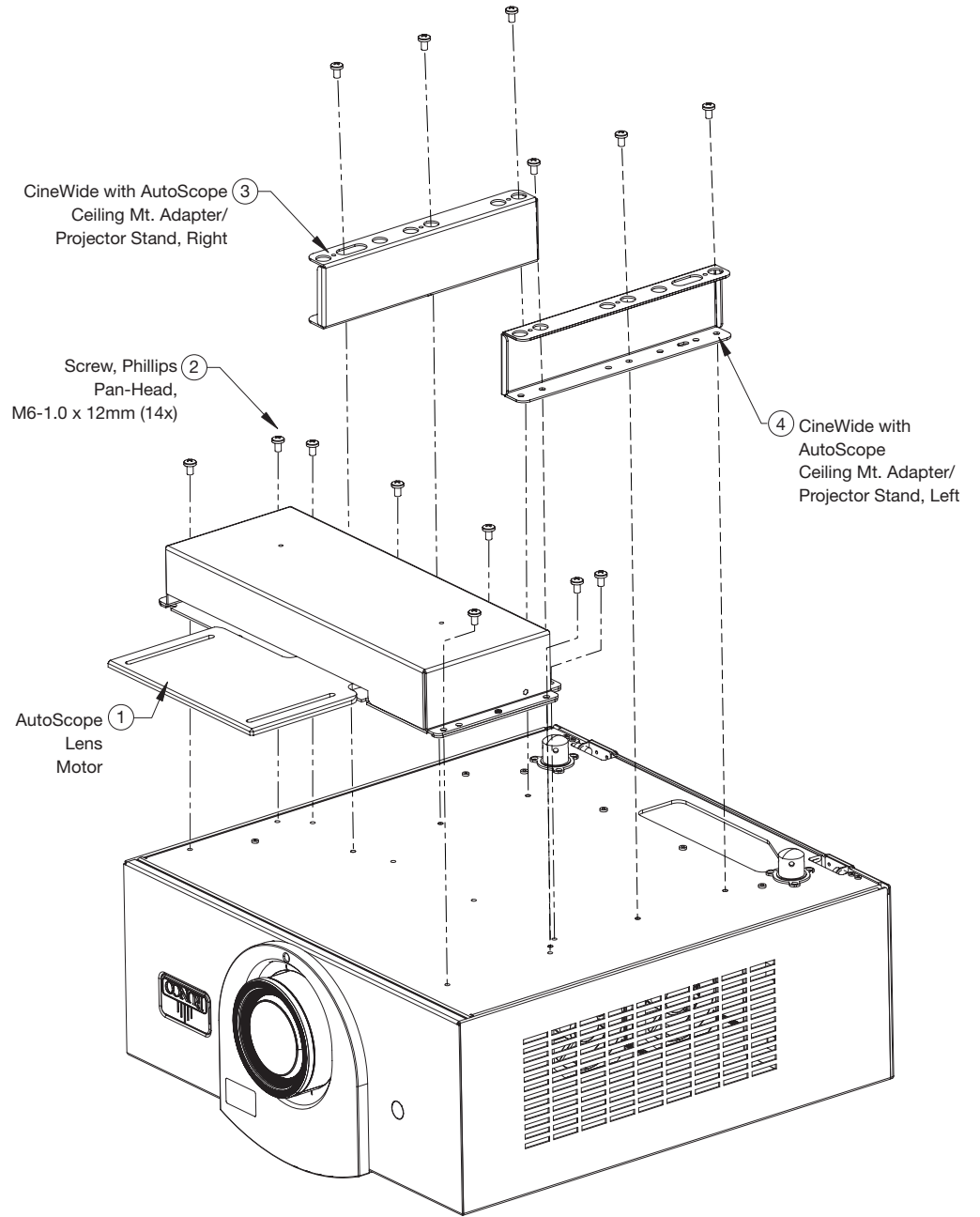
1. Do not install the CineWide lens yet, only the fixed CineWide base plate or AutoScope lens motor. You will install the CineWide lens after you install the projector and adjust the primary lens.
2. Some components shipped with your projector may differ slightly from what is shown in these instructions.

---

### 3.4 Installing the Optional CineWide/AutoScope Lens Mount

**Installing the AutoScope  
Lens Motor**

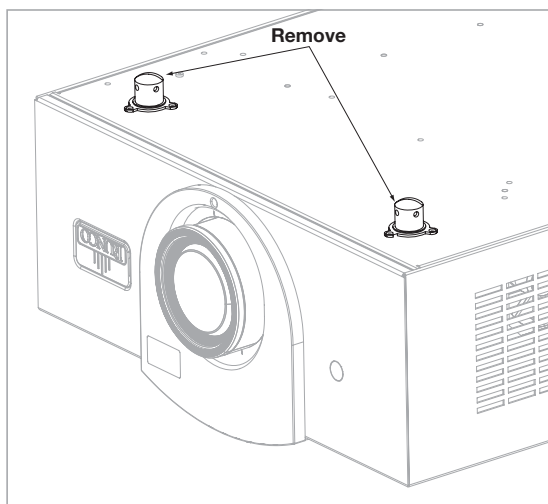
Figure 3-6 shows the Q-650i/CineWide with AutoScope motor assembly.



**Figure 3-6. Q-650i/CineWide with AutoScope Motor Assembly**

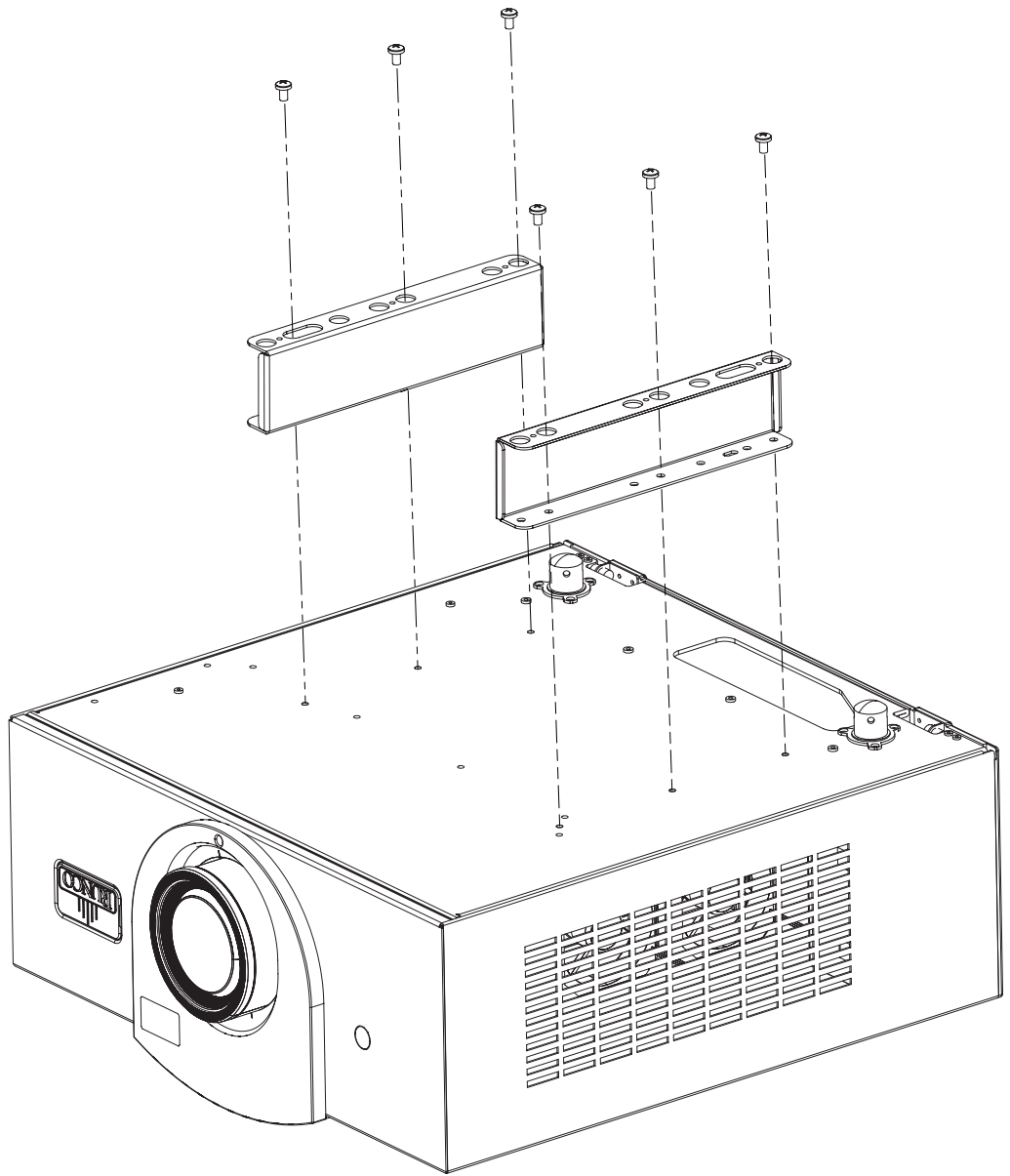
**Remove Projector Front Feet:**

Place the projector upside down on a blanket or other soft surface. Loosen and remove the two front feet on the projector.



**Install Ceiling Mount Adapters/Projector Stands:** For ceiling installations, these brackets bring the mounting points for the projector mounting plate (included with the projector ceiling mount kit) from the bottom of the projector up and around the AutoScope lens motor housing. For floor installations (where the projector is upright), the adapters allow the projector to lie flat on the mounting surface.

Using six (6) each of the supplied, M6 x 12mm Pan-Head Phillips screws (item #2), attach the AutoScope Ceiling Mount Adapters/Projector Stands (items #3 and #4) to the projector as shown in Figure 3-7.



**Figure 3-7. Q-650i with Ceiling Mount Adapters/Projector Stands**



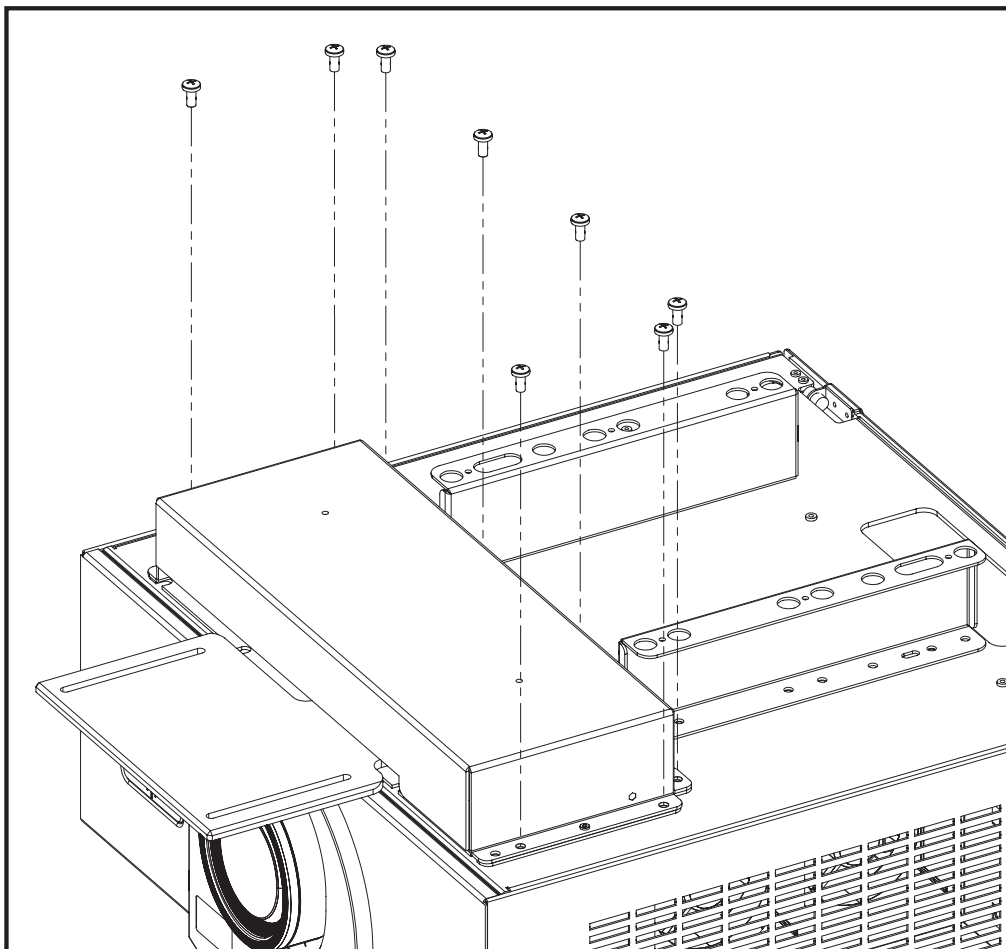
**Caution**

*DO NOT OVER-TIGHTEN THE SCREWS.*

**Install Lens Motor:**

1. Position the AutoScope Lens Motor as shown in Figure 3-8.
2. Line up the mounting holes on the lens motor housing with those on the underside of the projector.

3. Secure the motor to the projector with the eight (8) remaining M6 x 12mm Pan-Head Phillips screws.

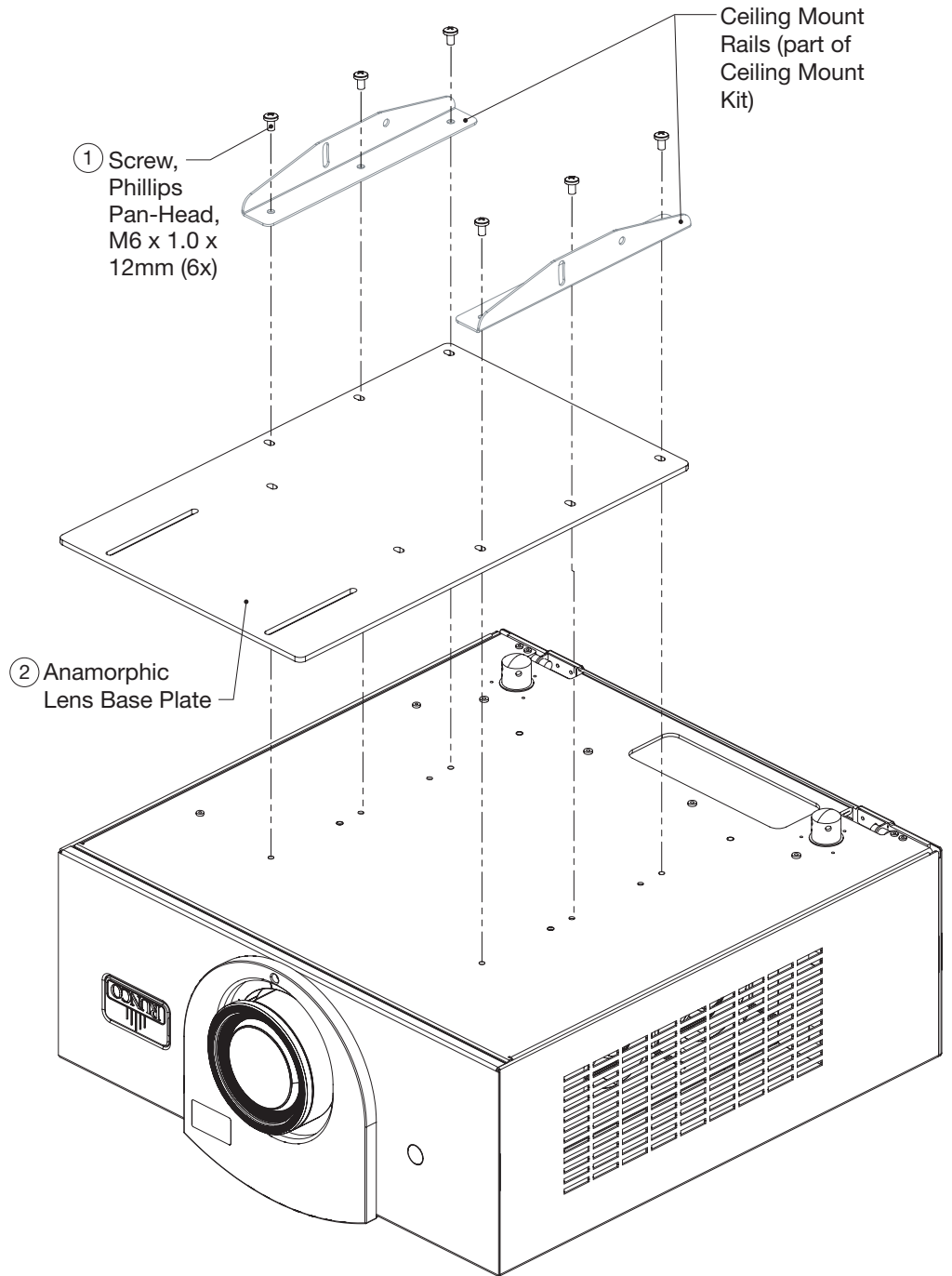


**Figure 3-8. AutoScope Lens Motor Installation**

After you have installed the AutoScope lens motor, proceed with **Mounting the Q-650i** on page 26.

**Installing the Fixed  
CineWide Base Plate**

Figure 3-9 shows the cylindrical (Rainier II/McKinley) lens base plate assembly for a Q750i/CineWide.



**Figure 3-9. Q-650i/CineWide with Rainier II/McKinley (Cylindrical) Lens Base Plate - Exploded View**



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To install the fixed CineWide base plate on a Q-650i/CineWide:

1. Place the projector upside down on a blanket or other soft surface.
2. Place the CineWide base plate on the bottom of the projector.
3. **If you are mounting the projector on a ceiling:** Line up the three holes on the left and right mounting rails (included with the projector ceiling mount kit) with those on the projector and base plate.
4. Secure the CineWide base plate (and ceiling mounting rails, if needed) to the projector with the Pan-Head Phillips screws provided with the CineWide lens base plate.

**Caution**

1. **Do not use the mounting screws provided with the ceiling mounting kit.** Use only the hardware provided with the CineWide lens base plate.
2. **DO NOT OVER-TIGHTEN THE SCREWS.**

### 3.5 Mounting the Q-650i

There are several methods for mounting the projector. Depending on your chosen installation, one method may be more suitable than another.

**Floor Mounting (Upright) ➤**

In typical front- and rear- screen installations, the projector can be mounted to a secure and level surface such as a table or cart. Carts are useful when moving a projector during a presentation or from site to site. If possible, lock the wheels when it's in position to prevent it from being moved during a presentation.

**Ceiling Mounting (Inverted) ➤**

For fixed installations, and for those that want the projector out of sight or have a limited space for projector and audience, you can invert the Q-650i and suspend it from the ceiling using a specially-designed ceiling mount fixture.



**Note**

*Use only the Runco-approved ceiling mount kit designed for your projector. Install the mount kit according to the instructions provided with it.*

The projector can also be inverted and placed in an enclosure above and behind the viewing area. Install four feet on the inside bottom surface of the enclosure on which the projector can rest. A variety of materials can be used for this purpose (for example, rubber crutch tips or turntable feet).

**Adjusting the Projector Height or Projection Angle ➤**

If the screen is significantly higher or lower than the projector (such as in a rear-projection installation), you can tilt the projector at an angle. In a ceiling installation, you do this by adjusting the ceiling mount.

If you do tilt the projector, you may need to vertically shift the image using the on-screen display (OSD) controls, to compensate. For detailed instructions, refer to **Using the On-Screen Menus** on page 45.

### 3.6 Connections to the Q-650i

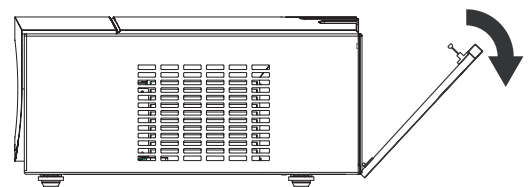
Proceed as follows to connect the Q-650i to your video sources, external controller(s) – if present – and AC power.

When connecting your equipment:

- Turn off all equipment before making any connections.
- Use the correct signal cables for each source.
- For best performance and to minimize cable clutter, use high-quality cables that are only as long as necessary to connect two devices. (Don't use a 20-foot cable when a 6-foot cable will suffice.)
- Ensure that the cables are securely connected. Tighten the thumbscrews on connectors that have them.

**Connector Panel Access ➤**

To access the connector panel, pull firmly on the cable access cover to open it.



Connect your video sources to the Q-650i as shown and described in the sections that follow.

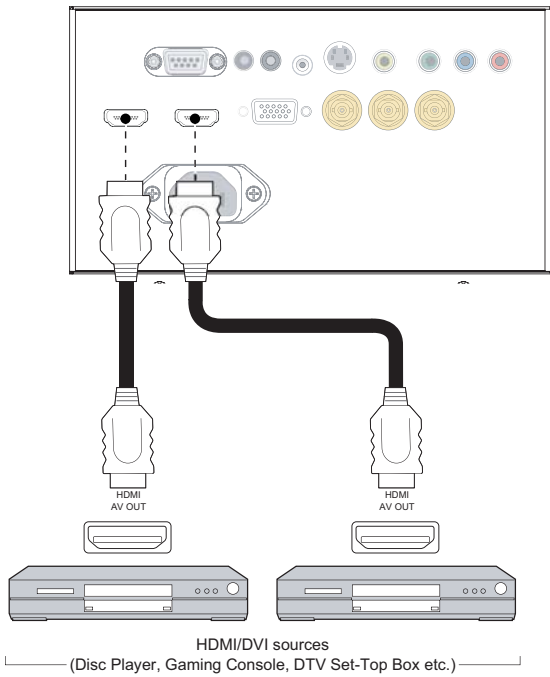
◀ **Connecting Source Components to the Q-650i**

**HDMI/DVI Connections:** See Figure 3-10.



**Tip**

Use the HDMI inputs whenever possible. This ensures the highest video quality because the signal is carried in the digital domain throughout the entire signal path, from source component output into the projector.

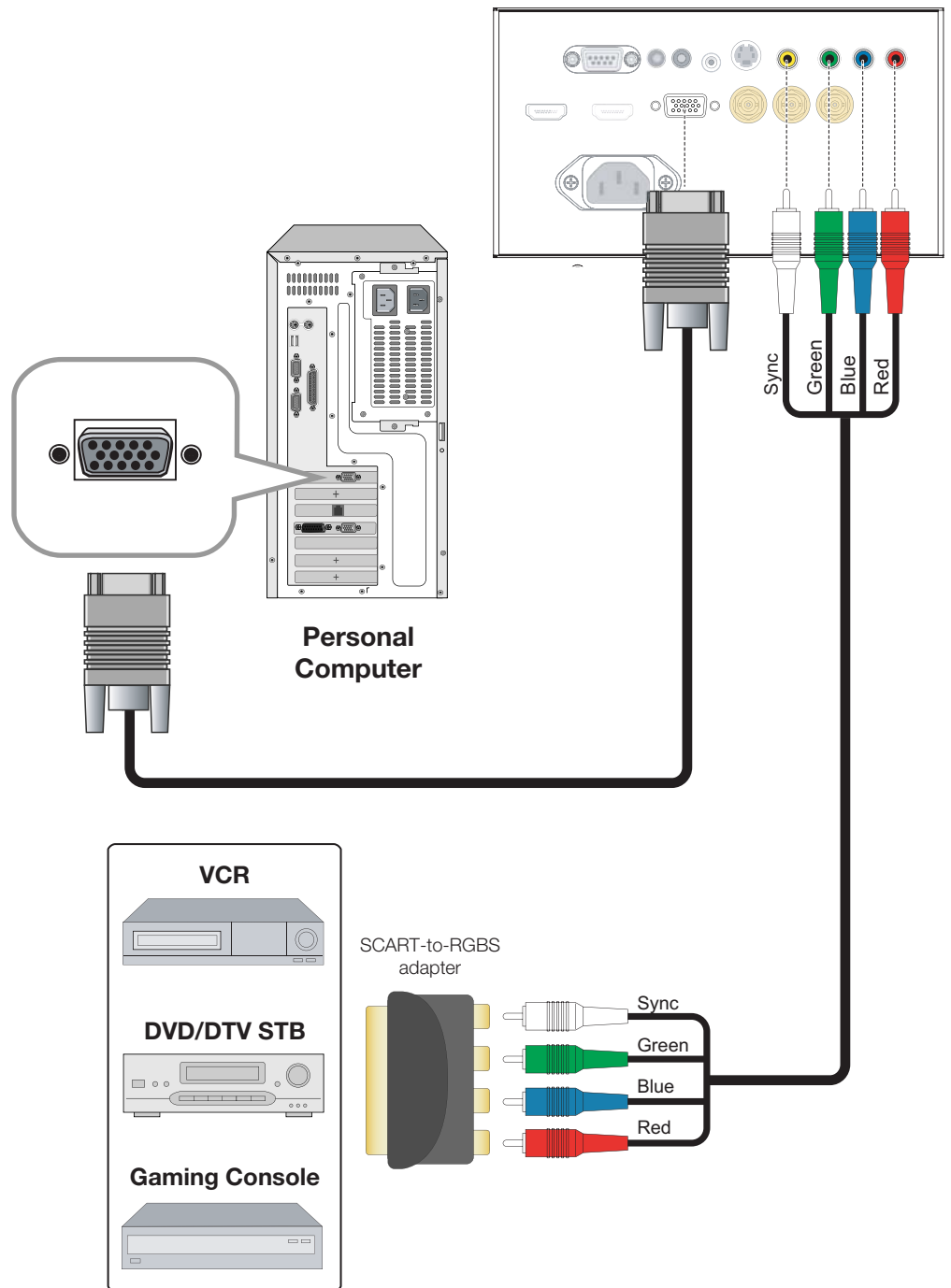


**Figure 3-10. HDMI/DVI Source Connections**

**RGB Connections:** Connect your personal computer or other RGB source to the **RGB** input.

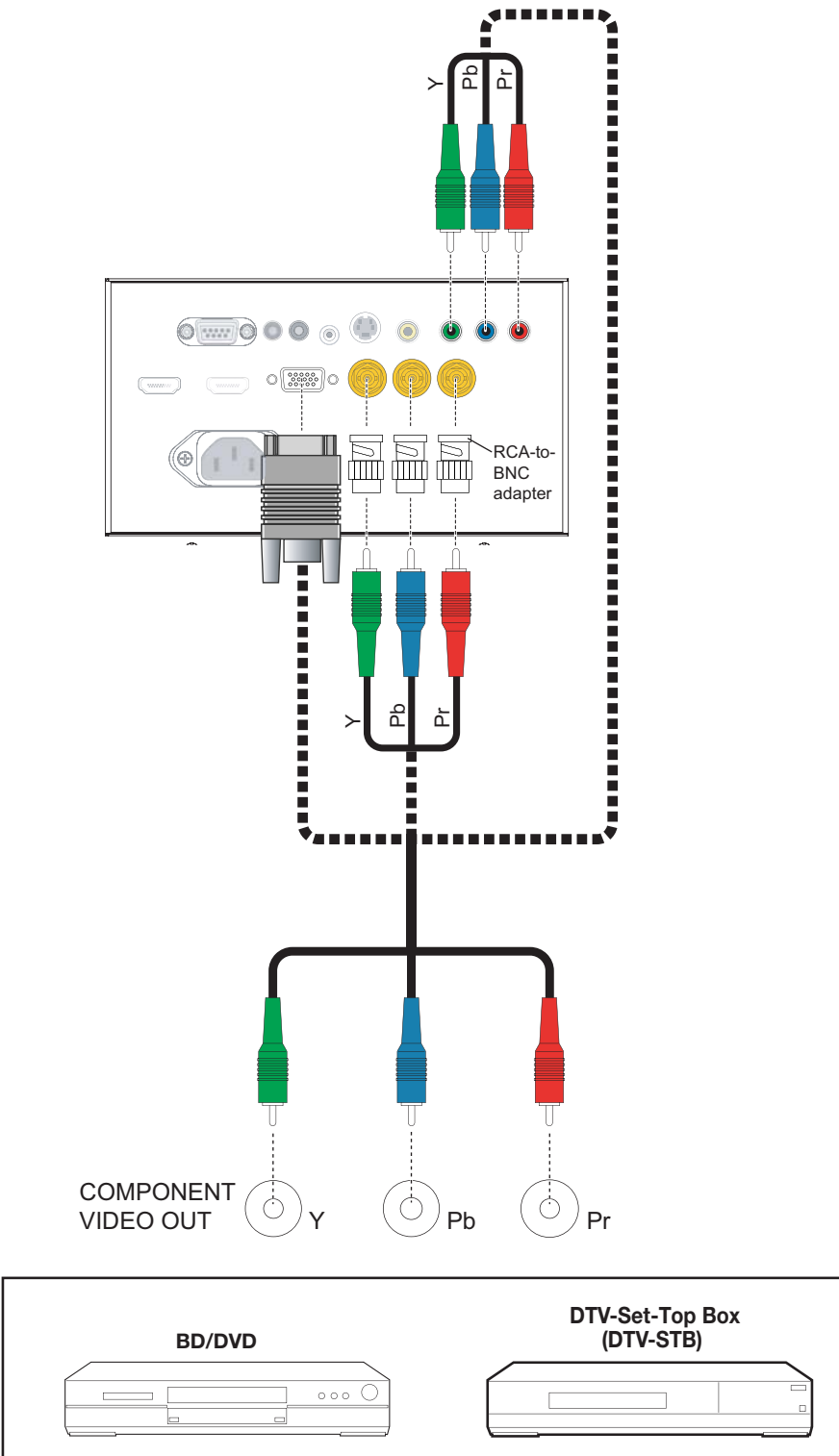
Optionally, if the source outputs RGB with composite sync, connect the green, blue and red outputs to the Y, Pb and Pr terminals on the **COMPONENT 1/SCART** input and the sync output to the **VIDEO** input.

See Figure 3-11.



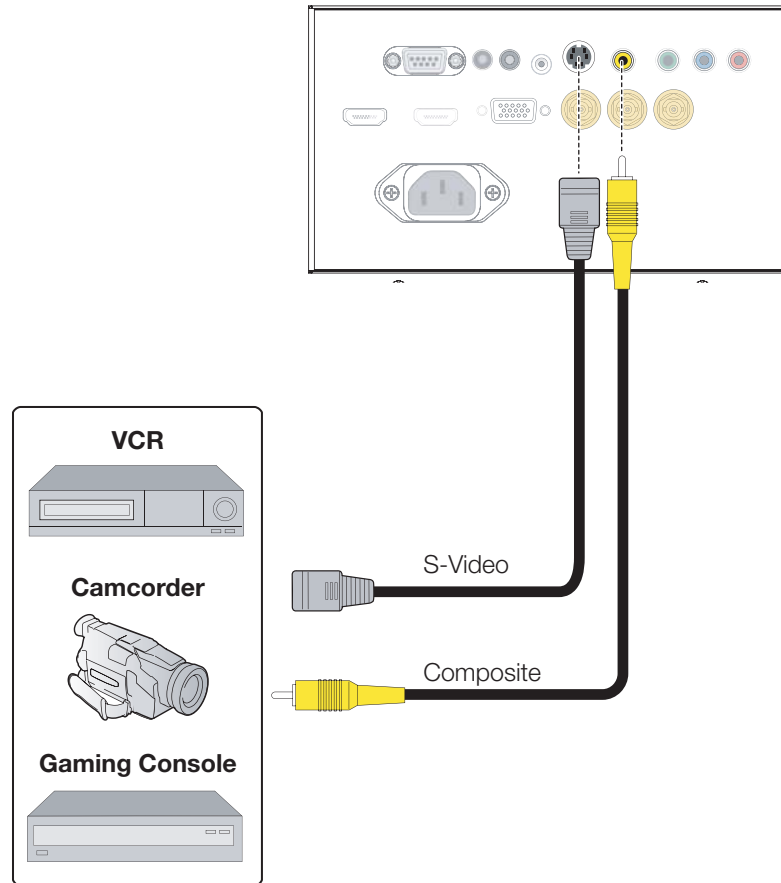
**Figure 3-11. RGB Connections**

**Component Video Connections:** Connect your component video sources to the **COMPONENT 1/SCART**, **COMPONENT 2** or **RGB** inputs as shown in Figure 3-12.



**Figure 3-12. Component Video Connections**

**Composite/S-Video Connections:** Connect your composite and S-Video sources to the Q-650i as shown in Figure 3-13.

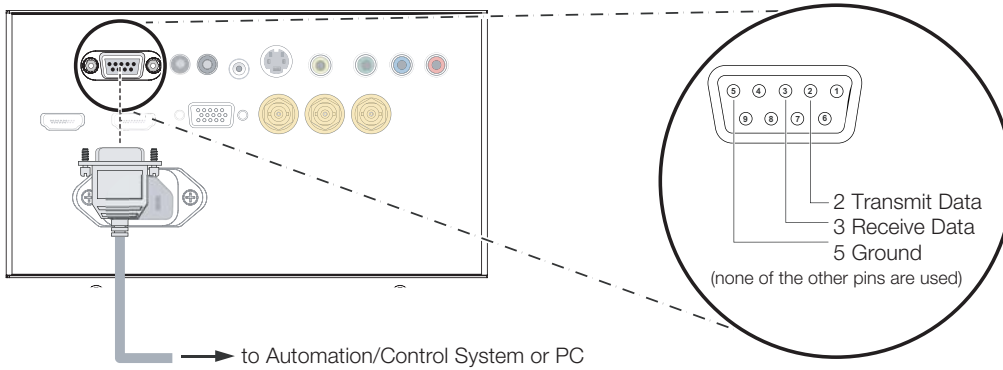


**Figure 3-13. Composite and S-Video Connections**

Connect a PC or home theater control/automation system (if present) to the RS-232 port on the Q-650i; see Figure 3-14. Use a standard, 9-pin serial cable, wired straight-through.

◀ **RS-232 Controller Connection**

For more information about using this connection, refer to **Serial Communications** on page 73.

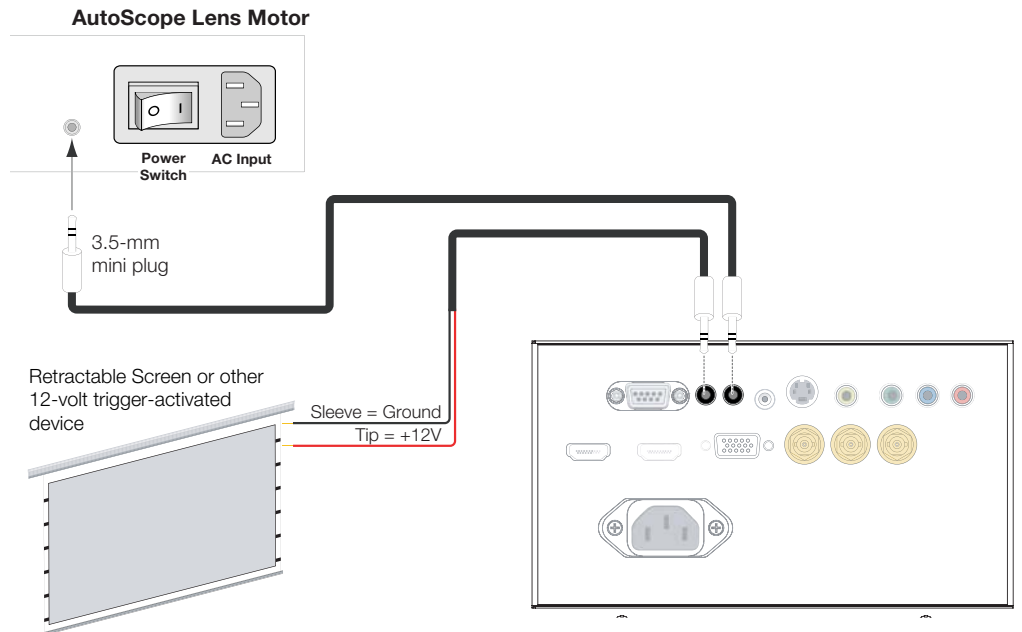


**Figure 3-14. RS-232 Control System Connection**

**Connecting 12-Volt Trigger Output to External Theater Equipment**

If your Q-650i is equipped with a CineWide with AutoScope system, connect the AutoScope lens motor to a 12-volt trigger output on the projector; see Figure 3-15.

Similarly connect other 12-volt trigger-activated equipment (such as retractable screens or screen masks) to the other trigger output.

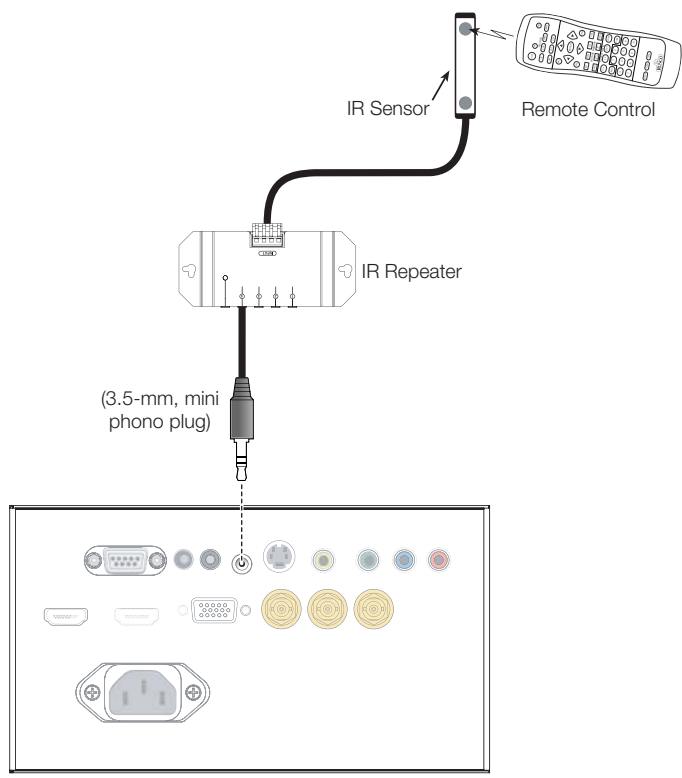


**Figure 3-15. Connecting 12-Volt Trigger Outputs**



If infrared signals from the remote control cannot reach the projector due to excessive distance or obstructions such as walls or cabinet doors, you can connect an external IR repeater system to the IR INPUT on the Q-650i to extend the range of the remote control. See Figure 3-16.

◀ **Connecting an External IR Receiver**



**Figure 3-16. External IR Receiver Connection**

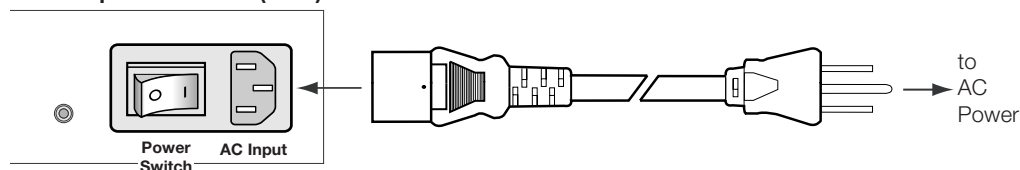
**Projector:** The Q-650i ships with various types of AC power cords. Choose the one that is appropriate to your locale.

◀ **Connecting to AC Power**

Plug the female end of the power cord into the AC receptacle on the rear of the projector (AC 100V ~ 240V); see Figure 2-2. Then, connect the other end to your AC power source.

**AutoScope Lens Motor:** With AutoScope-equipped projectors, an additional power cord is provided for the lens motor. Plug the female end of the AC power cord into the AC input on the rear of the lens motor assembly. Connect the other end to your AC power source.

**AutoScope Lens Motor (Rear)**



### 3.7 Turning on the Power

1. Turn on your source components.
2. If this is an AutoScope-equipped projector, turn on the main power switch at the rear of the AutoScope lens motor. The lens motor power switch is located next to the AC input (see above).
3. Press the **ON** button on the remote control to turn on the Q-650i. The LED flashes green to indicate that it is warming up.
4. When the projector is ready for use, the LED turns off.

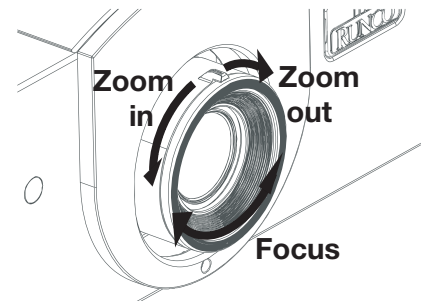
### 3.8 Primary Lens Adjustments

The Q-650i gives you a great deal of control over the picture size, position and focus.

#### **Focus and Zoom** ➤

To focus the projected image, grasp the lens by the outer ring and rotate it.

To make the picture smaller (zoom out) or larger (zoom in), move the zoom tab in the appropriate direction.

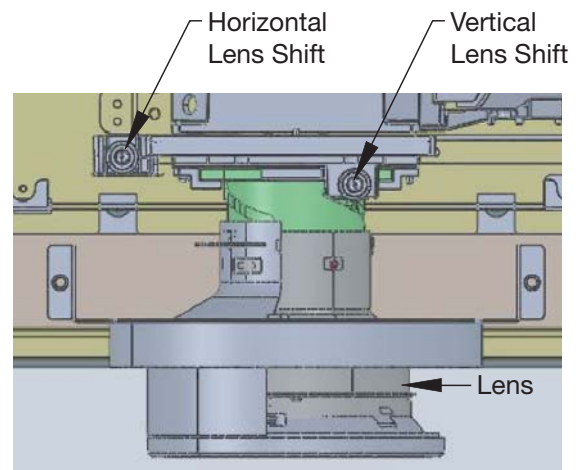


#### **Lens Shift** ➤

To access the lens shift controls, loosen the Phillips screw at the bottom of the decorative bezel on the front of the projector (see Figure 2-1). Then, remove the bezel.

**Vertical Lens Shift:** To shift the projected image vertically, insert the provided hex wrench into the vertical lens shift adjuster at the top of the projector (directly above the lens). Then, turn the wrench as shown to shift the lens in the desired direction.

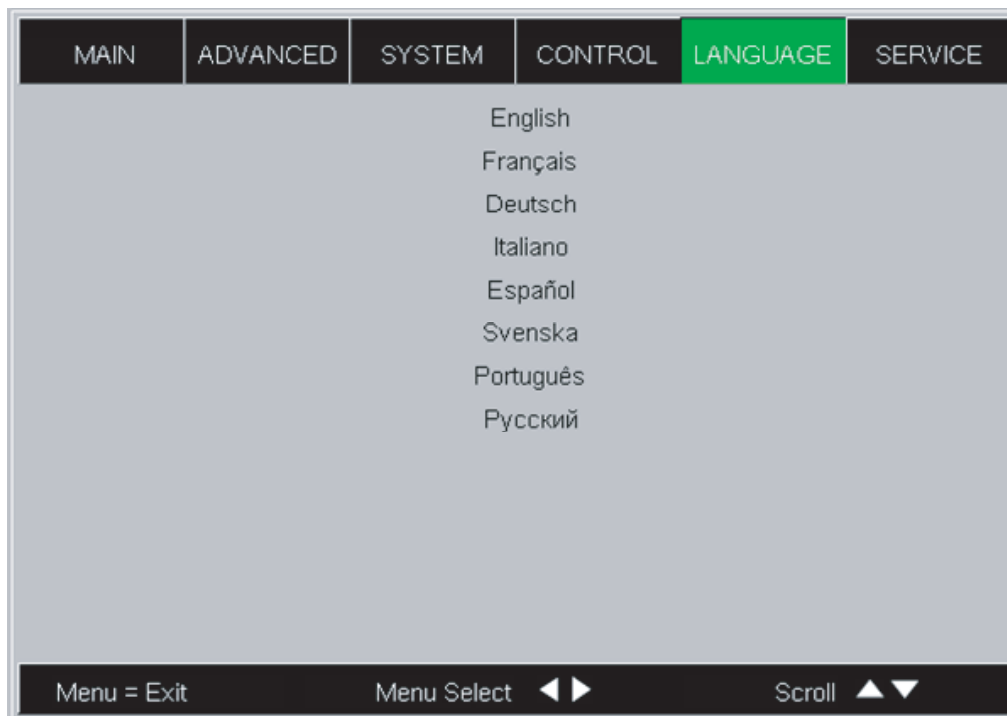
**Horizontal Lens Shift:** To shift the projected image horizontally, insert the provided hex wrench into the horizontal lens shift adjuster at the top of the projector. Then, turn the wrench as shown to shift the lens in the desired direction.



When you have finished adjusting the lens position, re-install the front bezel.

When you turn on the Q-650i for the first time, the OSD Language Menu appears.

The Q-650i can display the menus in English, French, German, Italian, Spanish, Swedish, Portuguese or Russian.



Press ▲ or ▼ to select a language. Then, press **ENTER** to confirm your selection.

If the Q-650i is installed behind the screen, you must change the picture orientation to match the installation method. To do this, press **MENU** on the remote control. Then, select System from the Main Menu.

If the projector is used in a rear-projection application (see Figure 3-5), press ▼ repeatedly to select Rear Projection from the System Menu. Press ◀ or ▶ to set it to On.

If the projector is ceiling-mounted, the Q-650i automatically inverts the image. If this automatic inversion is not desired, select Ceiling Mode from the System Menu and set it to **Off**.

### 3.9 Changing the OSD Language

### 3.10 Adjusting the Picture Orientation

◀ *Rear Projection*

◀ *Ceiling Mode*

### 3.11 Installing and Adjusting the CineWide Anamorphic Lens

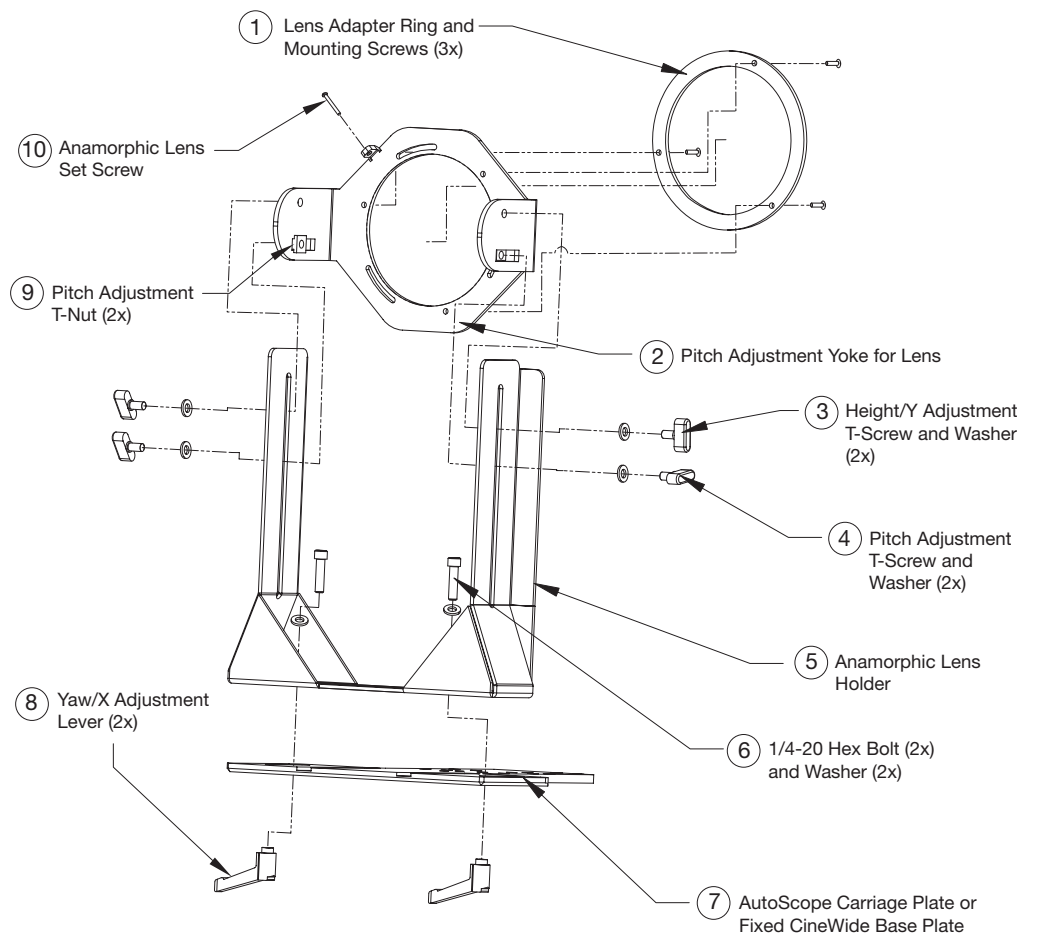
If you are installing a CineWide-equipped projector, proceed as follows to install and adjust the anamorphic lens.



**Note**

***It is extremely important that the primary lens is properly adjusted before you install the anamorphic lens. Ensure that the image from the primary lens is perfectly centered on the screen.***

The Anamorphic lens mount kit consists of everything shown in Figure 3-17. Some components shipped with your projector may differ slightly from what is shown in these instructions.

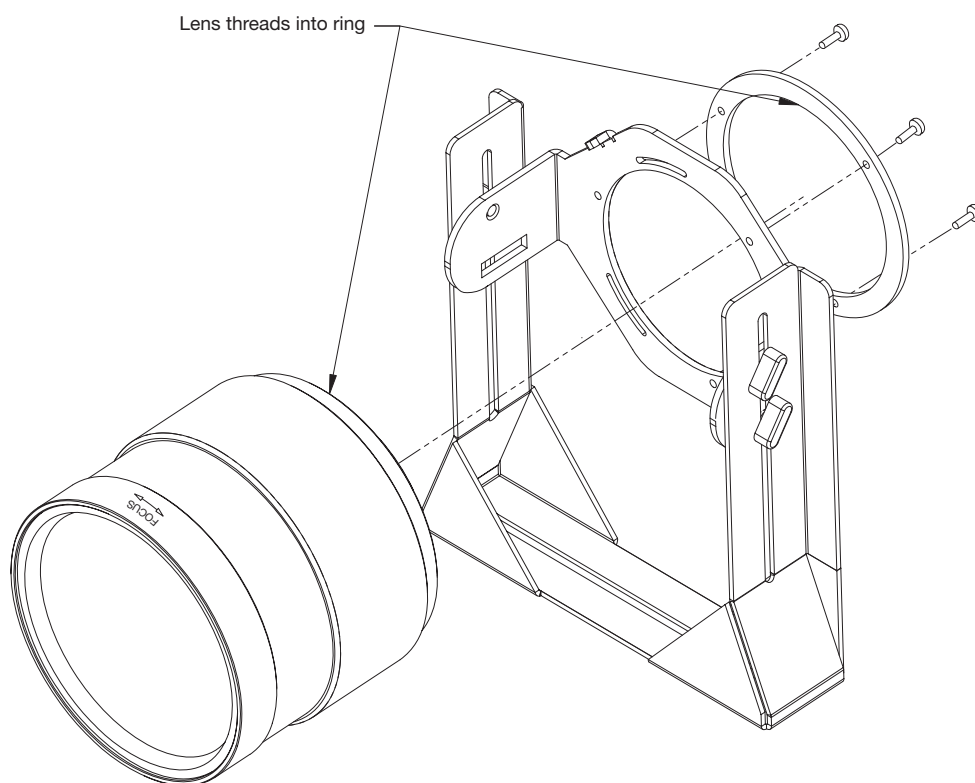


**Figure 3-17. Anamorphic Lens Mounting Assembly - Exploded View**

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**Attaching Lens Mounting Assembly to Lens Motor Carriage Plate or Fixed CineWide Base Plate:**

1. Remove the two Yaw/X Adjustment Levers (item #8) from the bottom of the Anamorphic Lens Holder (item #5).
2. Place the Anamorphic Lens Holder on top of the AutoScope Carriage Plate or Fixed CineWide Base Plate (item #7). Position the bracket so that the long slot at the bottom of the lens holder is perpendicular to the corresponding slots on the plate.
3. Secure the Anamorphic Lens Holder to the plate using the Hex Bolts/Washers (item #6) and Yaw/X Adjustment Levers that you removed in Step 1.
4. Use the Lens Mounting Screws to attach the Lens Adapter Ring (item #1) to the Pitch Adjustment Yoke (item #2); see Figure 3-18. (Use the round, threaded holes on the yoke.)
5. Use the Height/Y Adjustment T-Screws/Washers (item #3), Pitch Adjustment T-Screws/Washers (item #4) and T-Nuts (item #9) to attach the Pitch Adjustment Yoke and Lens Adapter Ring to the Anamorphic Lens Holder. **The Yoke should be as close to the primary lens as possible.**
6. Attach the lens to the Lens Adapter Ring by threading it clockwise.

**Figure 3-18. Attaching the Anamorphic Lens to the Lens Ring**

**Select the Appropriate CineWide Scaling Method:** CineWide and CineWide with AutoScope both produce the same image geometry for a given aspect ratio (refer to Table 4-2). However, when the viewer selects the 16:9, 4:3, Letterbox or VirtualWide aspect ratio, CineWide uses different scaling algorithms to compensate for the fact that the anamorphic lens is always in front of the primary lens.

To configure the Q-650i to use the appropriate CineWide scaling method:

1. Press **MENU** on the remote control.
2. Select Control from the Main menu and press **ENTER**.
3. Select CineWide from the Control menu.
4. For a Q-650i/CineWide (fixed anamorphic lens), choose **CineWide**. For a Q-650i/CineWide with AutoScope (motorized anamorphic lens), choose **AutoScope**.

**Configure Lens Motor Trigger (Q-650i/CineWide with AutoScope only):** CineWide with AutoScope maintains constant image height independent of the aspect ratio, while using the full display resolution of the projector. It accomplishes this by moving the anamorphic lens in front of the primary lens when widescreen material is being viewed. When the viewer transitions back to 16:9 or 4:3 source material, the anamorphic lens moves out of the light path.

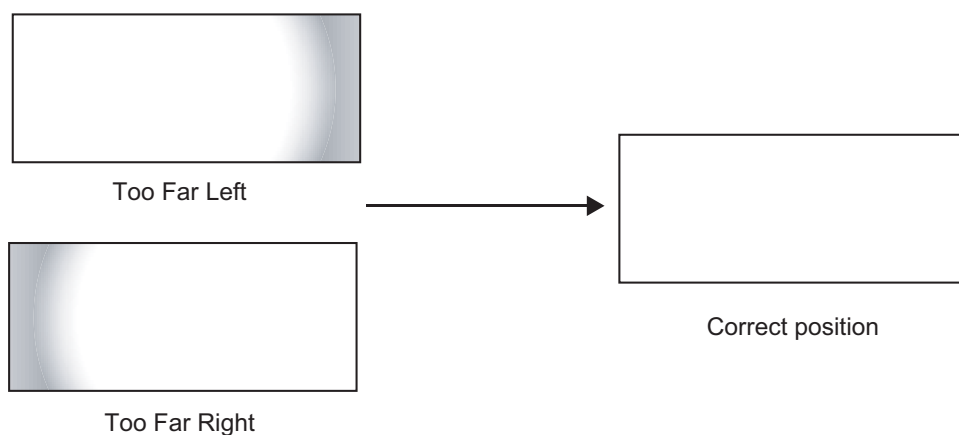
To configure the lens motor trigger on the Q-650i for proper AutoScope operation:

1. Press **MENU** on the remote control.
2. Select Control from the Main menu and press **ENTER**.
3. Select Trigger 1 or Trigger 2 (whichever one is connected to the lens motor) from the Control menu.
4. Set Trigger 1 or Trigger 2 to "AutoScope." This enables the lens motor to move the anamorphic lens into position (in front of the primary lens) when the Cinema or Virtual Cinema aspect ratio is selected.
5. Select the Cinema or Virtual Cinema aspect ratio to move the anamorphic lens into position, if it isn't already. To do this, press **CINEMA** or **VCINE** on the Q-650i remote control (Figure 2-3).

**Adjusting the Horizontal (X) Lens Position:**

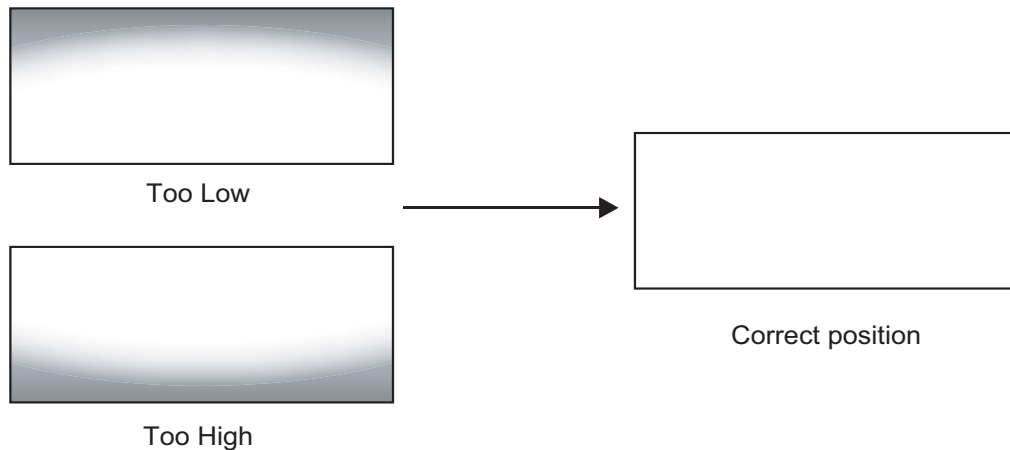
1. Project a white field on the screen.
2. Loosen the Yaw/X-Adjustment Levers underneath the lens.

3. Slowly move the anamorphic lens into place (from right to left or vice versa) so that there are no shadows on either side of the screen:



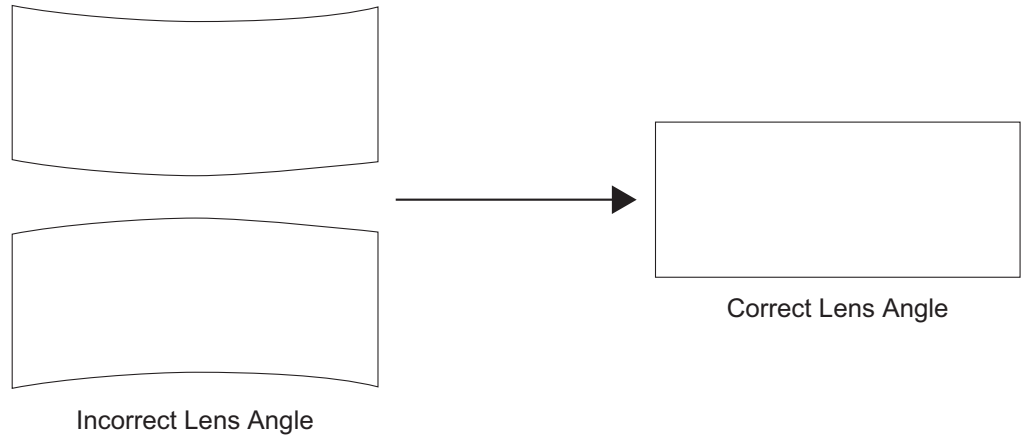
4. When the horizontal position is properly set, tighten the Yaw/X-Adjustment Levers to secure the lens in place.

**Adjusting the Height (Y):** With the white field still on-screen, loosen the Height/Y Adjustment T-Screws on either side of the lens. Then, slowly move the anamorphic lens into place so that there are no shadows on the top or bottom of the screen:



When the height is properly set, tighten the Height Adjustment T-Screws to secure the lens in place.

**Adjusting the Pitch (Angle):** Next, angle the lens to even out any top-to-bottom pincushion distortion. To do this, loosen the Pitch Adjustment T-Screws (directly below the Height/Y Adjustment T-Screws) on either side of the lens to allow it to pivot freely. Then, adjust the anamorphic lens angle so that the projected image is rectangular:



The anamorphic lens will almost always be angled with respect to the projector; this is normal.

Once the proper lens angle has been set, firmly tighten the Pitch Adjustment T-Screws to secure the lens in place.

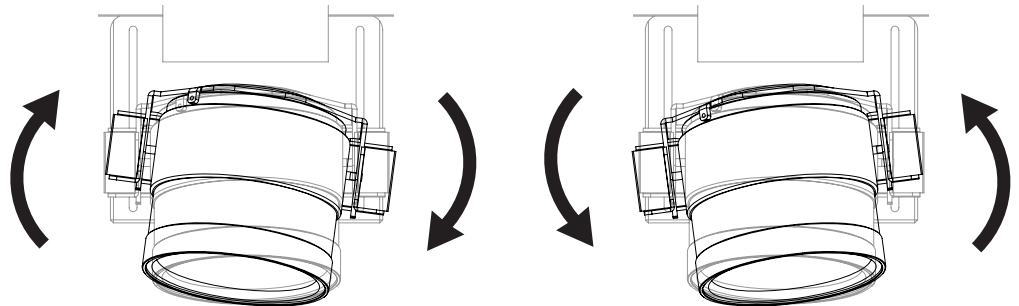


**Note**

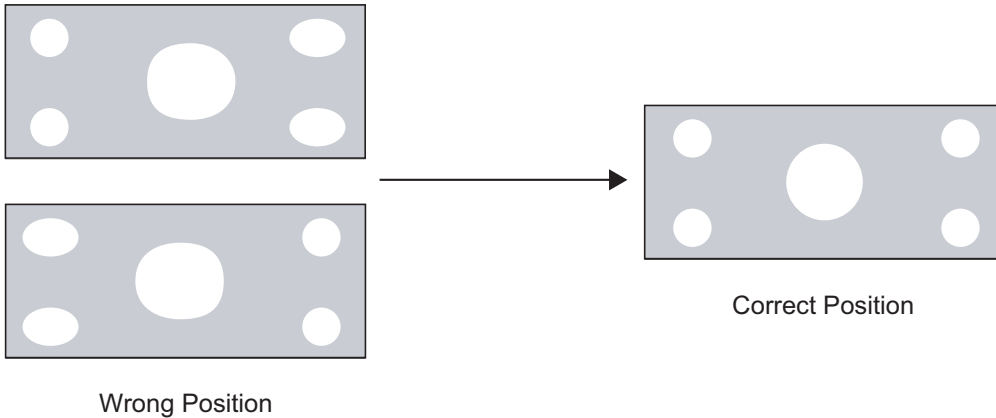
*There may be some pincushion distortion even after the lens is properly adjusted, especially at shorter throw distances. If this is the case, Runco recommends that you slightly over-scan the image into the screen frame area to mask the distortion.*

**Adjusting the Yaw:** Loosen the Yaw/X-Adjustment Levers to allow the lens to pivot freely from side to side. Then, angle the lens to even out any left-right pincushion distortion:

**Anamorphic Lens (Top View)**



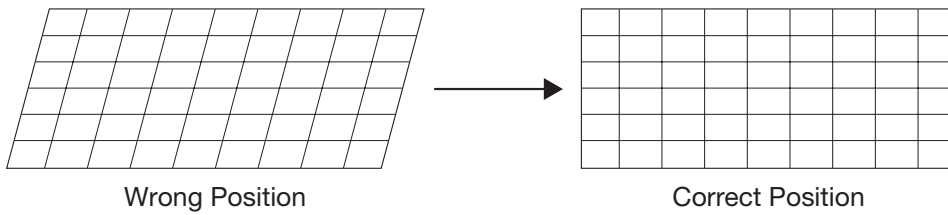




Once the proper lens angle has been set, firmly tighten the Yaw/X-Adjustment Levers to secure the lens in place.

**Geometry:**

1. Input an anamorphic cross-hatch test pattern to the projector.
2. Unscrew the Anamorphic Lens just enough to allow it to rotate freely.
3. Grasp the lens by the center ring and rotate the lens until the image is properly anamorphic:



4. When the image geometry appears correct, tighten the Anamorphic Lens Set Screw (item #10) to secure the lens in place. (When viewed from the front, the rear opening on the anamorphic lens should appear as a tall, narrow oval.)



**Focus:** Finally, rotate the Focus Ring on the anamorphic lens to fine-tune the optical focus.



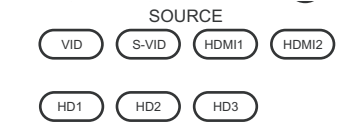
**Notes:**

# 4. Operation

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When you turn on the Q-650i, it switches to the last selected input and looks for a valid signal.

Use these buttons on the remote control to select an input source directly.



You can assign the HD 1, HD 2 and HD 3 buttons to any input. The default assignments are:

HD 1 = Component 1, HD 2 = Component 2,  
HD 3 = RGB.

For more information, refer to **HD 1 Key / HD 2 Key / HD 3 Key** on page 66.

For PIP purposes, there are three groups of inputs separated by their display modes:

- **Video (SD) group:** Video, S-Video and SCART inputs.
- **Graphic (HD) group:** Component 1, Component 2 and RGB inputs.
- **Digital Video group:** HDMI 1 and HDMI 2 inputs.

PIP shows one input from any of these groups within or beside one input from either of the other two groups.

For more information, refer to **PIP Position** on page 63.

---

## 4.1 Selecting An Input Source

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## 4.2 Using Picture-In-Picture (PIP)

For each source, Table 4-1 shows which of the other sources are available as a PIP source.

**Table 4-1. Available Main and PIP Source Combinations**

		PIP Input Source							
		VIDEO	S-VIDEO	SCART	COMP 1	COMP 2	RGB	HDMI 2	HDMI 1
<b>Main Input Source</b>	VIDEO	-	-	-	✓	✓	✓	✓	✓
	S-VIDEO	-	-	-	✓	✓	✓	✓	✓
	SCART	-	-	-	✓	✓	✓	✓	✓
	COMP 1	✓	✓	✓	-	-	-	✓	✓
	COMP 2	✓	✓	✓	-	-	-	✓	✓
	RGB	✓	✓	✓	-	-	-	✓	✓
	HDMI 2	✓	✓	✓	✓	✓	✓	-	-
	HDMI 1	✓	✓	✓	✓	✓	✓	-	-

Notes:

1. "✓" means that that source is available as a PIP source with a given main source; "-" means that it is not.
2. Disabled sources (refer to **Input Enable** on page 62) are not **available** as PIP sources.

1. Press the **MENU** button on the remote control to display the Main Menu.
2. There are six menus. Press ◀ or ▶ to select a sub-menu.
3. Press ▲ or ▼ to select a sub-menu item.
4. For each sub-menu item, the currently-selected value appears in white text or is otherwise highlighted. Press ◀ or ▶ to choose a setting for that item, or press **ENTER** to go to another sub-menu.
5. Press **MENU** to return to the previous menu.
6. From the Main Menu, press **MENU** to turn off the OSD menu.

The Q-650i OSD menus are arranged hierarchically, as shown in Figure 4-1. Depending on the selected input source and signal characteristics, some menu options may not be available.

### 4.3 Using the On-Screen Menus

<b>Main</b>	Aspect Ratio	16:9, Letterbox, 4:3, VirtualWide, Cinema or V-Cinema	
	Memory	Recall Memory	
		Save Settings	
		Save ISF	
	Brightness	0 ... 50* ... 100	
	Contrast		
	Color		
	Tint		
	Sharpness		
	Noise Reduction		
	Overscan		Off, Crop or Zoom
	Input Select		HDMI 1, HDMI 2, RGB, Comp. 1, Comp. 2, Video, S-Video or SCART
	PIP Select	Off, HDMI 1, HDMI 2, RGB, Comp. 1, Comp. 2, Video, S-Video or SCART	
	Resync	(press ENTER to execute)	
<b>Advanced</b>	Color Space	Auto, REC709, REC601, RGB-PC or RGB-Video	
	Video Standard	Auto, NTSC, PAL or SECAM	
	Gamma	1.8, 2.0, 2.2, 2.35 or 2.5	
	Color Temperature	5500K, 6500K, 7500K or 9300K	
	DLP Frame Rate	Auto, 48 Hz, 50 Hz or 60 Hz	
	Color Gamut	Auto, REC709, SMPTE-C, EBU, Native, DCI or PCE	
	ConstantContrast	Low, Medium, High or Off	
	Adaptive Contrast	On or Off	
	RGB Adjust	Red / Green / Blue Offset	
		Red / Green / Blue Gain	
	Fine Sync	V. Position	
		H. Position	
		Phase	
		Tracking	
		Sync Level	
	PCE	Hue (Red / Yellow / Green / Cyan / Blue / Magenta)	
		Saturation (Red / Yellow / Green / Cyan / Blue / Magenta)	
Level (Red / Yellow / Green / Cyan / Blue / Magenta)			
Runco Smart Color (RSC) (On or Off)			
White Balance (Red / Green / Blue Gain)			

<b>System</b>	Input Enable	On or Off for each source	
	PIP Position	Top Left, Top Right, Bottom Left, Bottom Right, Picture-by-Picture or Split Screen	
	Menu Position	Top Left, Top Right, Bottom Left, Bottom Right or Center	
	Translucent Menu	0% (opaque), 25%, 50% or 75%	
	Blank Screen	Logo, Black, Blue or White	
	Auto Power Off	On or Off	
	Auto Power On		
	Rear Projection		
	Ceiling Mode	Auto, On or Off	
	Logo Display	On or Off	
	Power On Chime		
	<b>Control</b>	HD 1 Key	HDMI 1, HDMI 2, RGB, Comp. 1, Comp. 2, Video, S-Video or SCART
		HD 2 Key	
HD 3 Key			
CineWide		Off, CineWide or AutoScope	
Trigger 1		AutoScope, Lamp, 4:3 or RS-232	
Trigger 2			
<b>Language</b>	English, French, German, Italian, Spanish, Swedish, Portuguese or Russian		
<b>Service</b>	Model Name	(read-only)	
	Unit Serial Number		
	Software Version		
	LED Driver Version		
	Active/PIP Source		
	Pixel Clock		
	Signal Format		
	H/V Refresh Rate		
	Factory Reset	Reset Everything? (Yes or No)	
	Blue Only	On or Off	
	Test Patterns	On or Off	
Altitude	Auto or High		

Figure 4-1. Q-650i OSD Menu Structure

**Main** ➤ The Q-650i Main Menu, shown in Figure 4-2, provides access to the most commonly-used projector functions.



**Note**

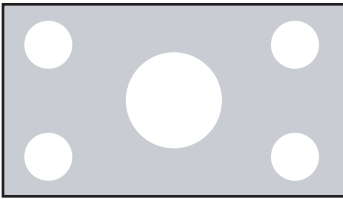
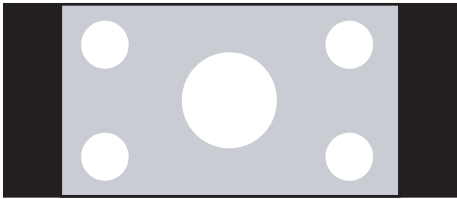
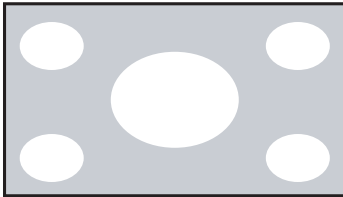
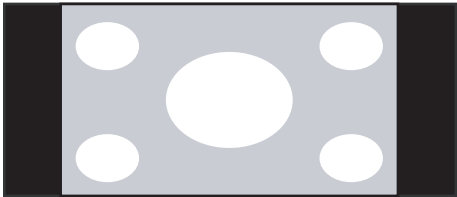
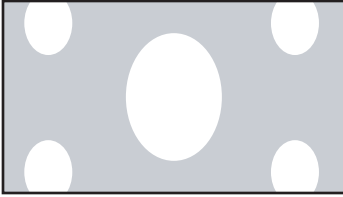
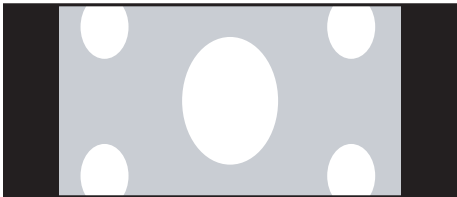
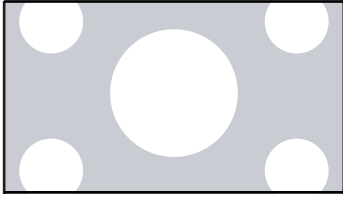
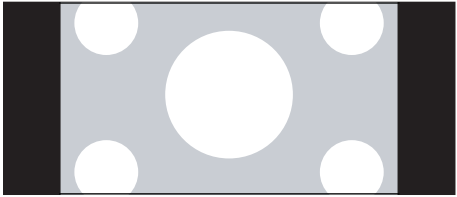
1. For best results, Runco recommends that you set *ConstantContrast* to *Off* before adjusting *Brightness*, *Contrast* and other image quality settings in this menu (refer to **ConstantContrast** on page 58). After you have completed the initial calibration, set *ConstantContrast* to *On* if desired.
2. Image controls only operate on the active source. To adjust the PIP source, switch to the PIP source (thereby making it the active source), adjust the controls and then switch back.

MAIN	ADVANCED	SYSTEM	CONTROL	LANGUAGE	SERVICE
Aspect Ratio		16:9	Letterbox	4:3	VirtualWide Cinema V-Cinema
Memory				Enter	
Brightness				100	
Contrast				100	
Color				100	
Tint				100	
Sharpness				100	
Noise Reduction				100	
Overscan			Off	Crop	Zoom
Input Select				Enter	
PIP Select				Enter	
Resync				Enter	
Menu = Exit                      Menu Select ◀▶                      Scroll ▲▼					

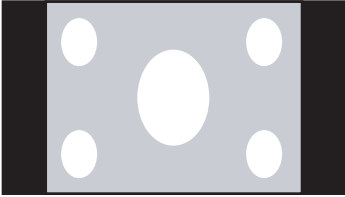
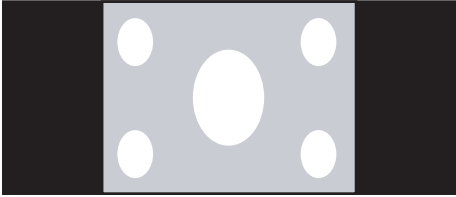
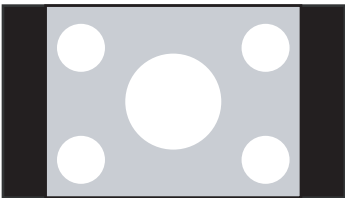
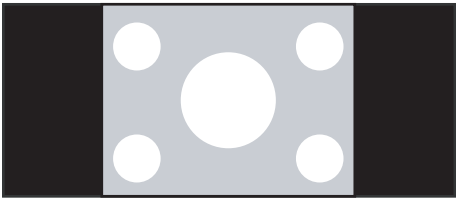
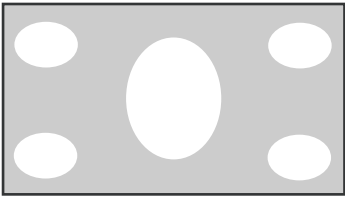
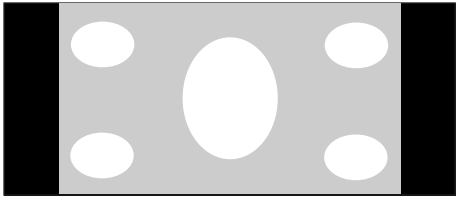
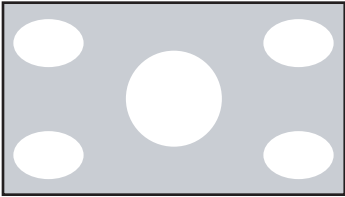
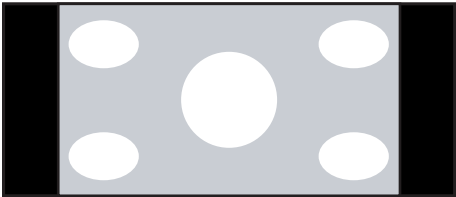
**Figure 4-2. Q-650i Main Menu**

**Aspect Ratio:** To change the aspect ratio (size and shape) of the projected image, press ▲ or ▼ to highlight Aspect Ratio. Use the ◀ or ▶ buttons to select the appropriate aspect ratio for your screen size, installed lens configuration and the type of program material being viewed, then press ENTER; refer to Table 4-2.

**Table 4-2. Aspect Ratio Settings**

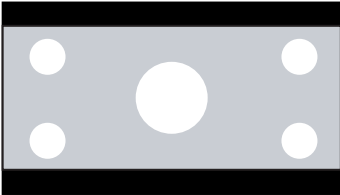
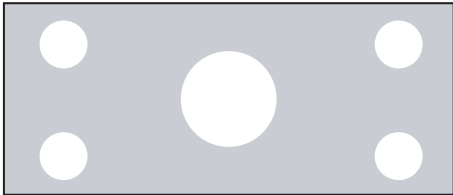
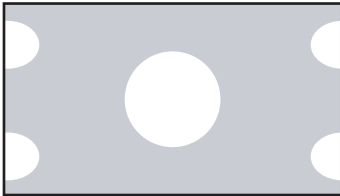
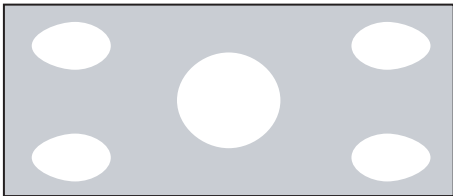
Aspect Ratio Setting	Description	Aspect Ratio of Source Signal	Geometry of Projected Image	
			With Standard Lens (1.78:1 Screen)	With Anamorphic Lens (2.35:1 Screen)
<b>16:9</b>	16:9 linearly scales the source active image horizontally and vertically to fill a 16:9 screen.	16:9		
		4:3		
<b>Letterbox</b>	With a 16:9 source image, Letterbox mode crops the top and bottom portion of the image and vertically stretches the remaining portion to fill a 16:9 image area.	16:9		
	It scales (zooms in on) a 4:3 image linearly (by the same amount on all sides) to fill a 16:9 display.	4:3		

**Table 4-2. Aspect Ratio Settings (continued)**

Aspect Ratio Setting	Description	Aspect Ratio of Source Signal	Geometry of Projected Image	
			With Standard Lens (1.78:1 Screen)	With Anamorphic Lens (2.35:1 Screen)
<b>4:3</b>	4:3 linearly scales the source active image horizontally and vertically to fill a 4:3 rectangle which is centered and the same height as the 16:9 designated image area. The remaining area is black.	16:9		
		4:3		
<b>Virtual-Wide</b>	A 16:9 image is shrunk horizontally in the center and stretched horizontally in a NON-linear fashion (more on the sides).  A 4:3 image is horizontally scaled in a NON-linear fashion (more on the sides than in the center) to fit a 16:9 screen.	16:9		
		4:3		



**Table 4-2. Aspect Ratio Settings (continued)**

Aspect Ratio Setting	Description	Aspect Ratio of Source Signal	Geometry of Projected Image	
			With Standard Lens (1.78:1 Screen)	With Anamorphic Lens (2.35:1 Screen)
<b>Cinema</b>	Select Cinema to view 2.35 source material in its native aspect ratio.	2.35:1		
	With a 16:9 screen and a non-CineWide projector (no anamorphic lens), the upper and lower portions of the screen are masked, but the geometry of the active image area is unchanged.  With a 2.35:1 screen and a CineWide-equipped projector, the video processor scales the 2.35:1 image so that the active image area fills the 16:9 chip surface, eliminating the black bars. The secondary, anamorphic lens then restores the proper geometry to the 2.35:1 image.			
<b>V-Cinema (Virtual Cinema)</b>	A 16:9 image is scaled NON-linearly (more on the sides than in the center) to fit a 2.35:1 screen.  Virtual Cinema is available only on CineWide-equipped projectors.	16:9		

**Memory:** Select Memory from the Main menu, then press **ENTER** to recall image quality settings previously saved, or to save changed settings in any of four memory locations.

- **Recall Memory:** Select Recall Memory from the Memory menu to recall saved image quality settings. Unless you select **Default** (see below), this control affects all sources, not just the active source.
  - **Custom 1** and **Custom 2** contain the factory default settings when the projector is initially turned on.
  - When you recall the **ISF Day** or **ISF Night** memory settings, all settings associated with these stored values are grayed out. This prevents unintended adjustments from being made. To remove this restriction, choose **Custom 1** or **Custom 2**.

**ISF Day** and **ISF Night** are grayed out unless these custom settings have already been saved.

- Choose Default to restore the factory-default settings for the active source only. The other sources are unaffected.
- **Save Settings:** Select Save Settings from the Memory menu to save any image-related settings you have changed to **Custom 1** or **Custom 2**.

The following items are saved (for all sources, not just the active source):

- Brightness / Contrast
- Color / Tint
- Sharpness
- Noise Reduction
- Color Space
- Video Standard
- Gamma
- Color Temperature
- DLP Frame Rate
- Color Gamut (including PCE settings)
- Constant Contrast
- Adaptive Contrast
- RGB Adjust (all settings in sub-menu)
- **Save ISF:** Select Save ISF from the Memory menu to save any image-related settings you have changed to the **ISF Day** or **ISF Night** memory location.

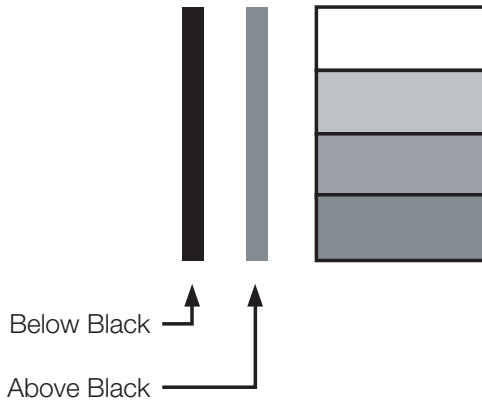


**Note**

***You must enter a passcode to access the Save ISF sub-menu.***

The settings that are saved are the same as those saved with the **Save Settings** command (see above).

**Brightness:** On your external test pattern source, select a PLUGE pattern. (PLUGE is an acronym for “Picture Line-Up Generation Equipment.”) Figure 4-3 shows a typical PLUGE pattern.



**Figure 4-3. Typical PLUGE Pattern for Adjusting Brightness**

PLUGE patterns vary but generally consist of some combination of black, white and gray areas against a black background. The example above includes two vertical bars and four shaded boxes.

Select Brightness from the Main menu. Use the ◀ or ▶ buttons to adjust the level so that:

- The darkest black bars disappear into the background.
- The dark gray areas are barely visible.
- The lighter gray areas are clearly visible.
- The white areas are a comfortable level of true white.
- The image contains only black, gray and white (no color).

**Contrast:** On your external test pattern source, select a stepped, gray-bar pattern like the one shown in Figure 4-4.



**Figure 4-4. Typical Gray Bar Pattern for Adjusting Contrast**

Select Contrast from the Main menu. Use the ◀ or ▶ buttons to adjust the contrast up until the top two bars become almost the same brightness, then down just until the brightness change between these bars is consistent with the other bars.

**Note**

*Brightness and Contrast controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.*

**Color:** To adjust the overall color intensity, select Color from the Main menu. Decrease this setting if colors are overly saturated; increase it if colors appear muted or washed out.

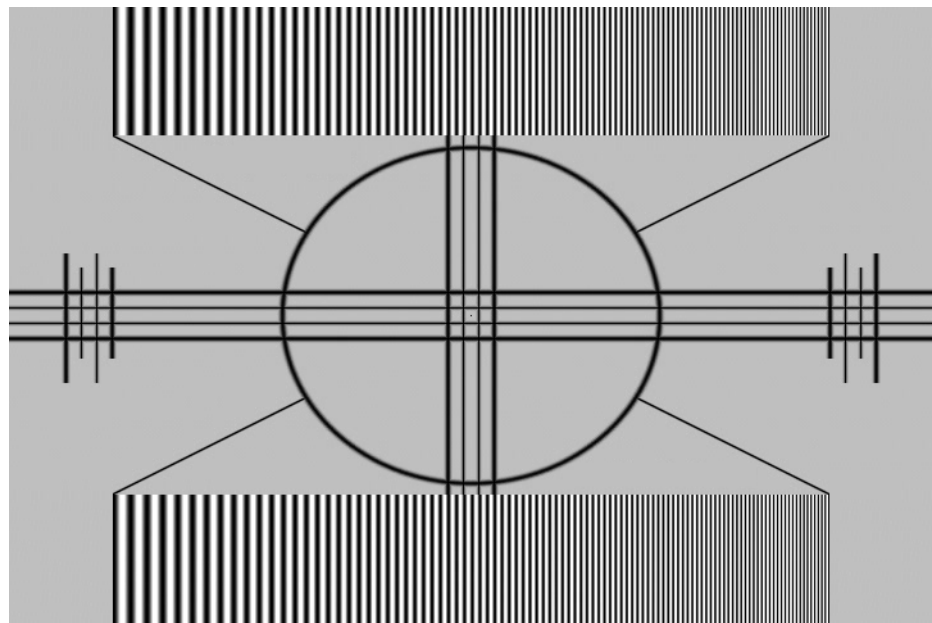
**Tint:** Tint or “hue” is the ratio of red to green in the color portion of the image. To adjust the tint, select Tint from the Main menu. Decrease this setting to shift the hue toward red; increase it to shift the hue toward green.

**Note**

*Like the Brightness and Contrast controls, the color and tint controls are interactive. A change to one may require a subtle change to the other in order to achieve the optimum setting.*

**Sharpness:** “Sharpness” is the amount of high-frequency detail in the image. To adjust this, select Sharpness from the Main menu. On your external test pattern source, select a pattern like the one shown in Figure 4-5.

Adjust as needed, looking for white edges around the transitions from black to gray and differently-sized lines in the “sweep” patterns at the top and bottom. Lower the sharpness setting to eliminate them.



**Figure 4-5. Typical Test Pattern for Adjusting Sharpness**

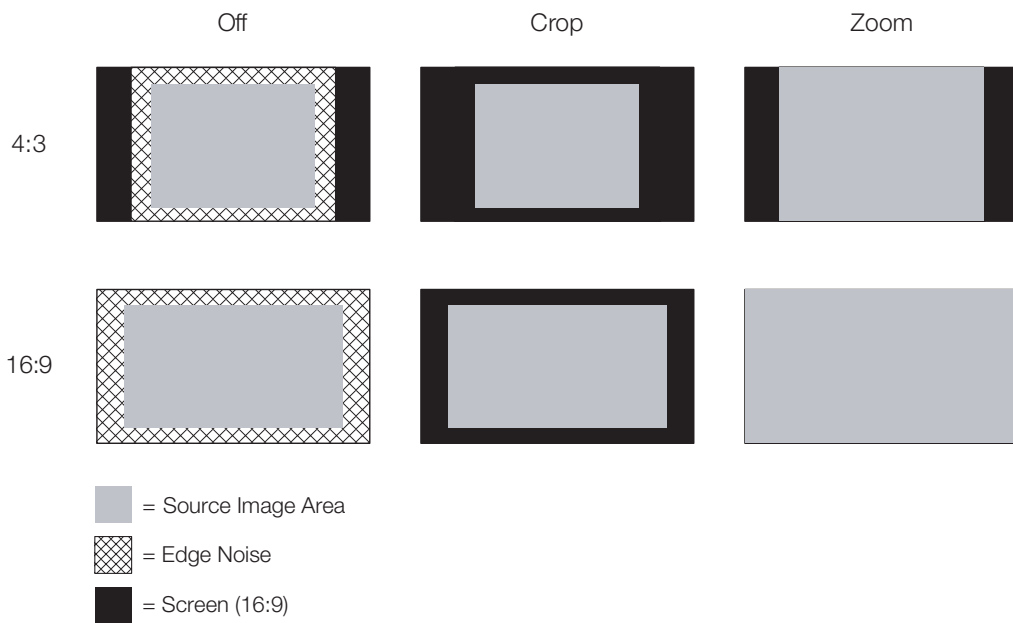
**Noise Reduction:** To apply noise reduction to the source signal, select Noise Reduction from the Main menu. Noise Reduction is useful for clearing up noisy images from interlaced SD sources.

Use the ◀ or ▶ button to adjust as desired, keeping in mind that reducing noise (which reduces high frequencies) may also soften the image.

**Overscan:** Some television programs are produced based on the assumption that older television sets may not display the outer edges of the broadcast picture area. Overscan effectively hides these inactive, outer edges of the image. Choose one of the following:

- **Off:** This setting leaves the image as-is.
- **Crop:** This setting adds a mask at the left and right edges of the source active image equal to 3% of the displayed horizontal resolution, and at the top and bottom edges equal to 3% of the displayed vertical resolution.
- **Zoom:** This setting adds a factor to the scaling of the source active image so that the vertical and horizontal resolutions are 106% of the size determined by the aspect ratio function. Anything outside of the original image area is removed.

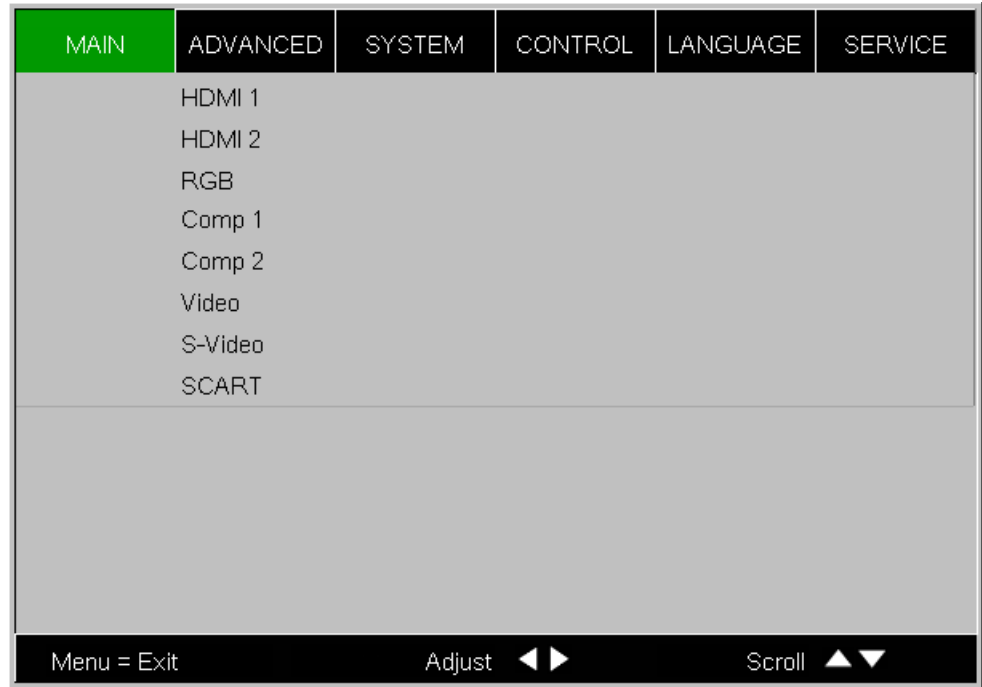
Figure 4-6 illustrates the effect of each overscan setting for each aspect ratio.



**Figure 4-6. Overscan Examples**

**Input Select:** To select a video source, press ▲ or ▼ to highlight Input Select, then press ENTER. This displays the Input Select sub-menu, shown in Figure 4-7.

The default source selection is **HDMI 1**. All sources that are not available per the source enable function (refer to **Input Enable** on page 62) are grayed out.



**Figure 4-7. Input Select Sub-Menu**

**PIP Select:** To select a PIP (secondary) video source, press ▲ or ▼ to highlight PIP Select, then press **ENTER**. The default PIP selection is Off.

All sources that are not available per the source enable function (refer to **Input Enable** on page 62) are grayed out.

All sources that cannot be used for PIP due to a shared electronic path with the Active source are grayed out. The PIP source is a saved setting for each source, like brightness and contrast.

If for some reason the current PIP source becomes invalid (by disabling it in the source enable menu, for instance), PIP Select automatically resets to Off.

**Resync:** If the projected image becomes unstable or degraded, press ▲ or ▼ to highlight Resync, then press **ENTER**. This causes a re-acquisition of the active source and the PIP source, if present. It also changes any Fine Sync settings (described on page 59) for this timing to the default setting.

Use the controls in the Advanced menu, shown in Figure 4-8, to perform advanced image adjustments.

◀ **Advanced**

MAIN	ADVANCED	SYSTEM	CONTROL	LANGUAGE	SERVICE
Color Space	Auto	REC709	REC601	RGB-PC	RGB-Video
Video Standard	Auto	NTSC	PAL	SECAM	
Gamma	1.8	2.0	2.2	2.35	2.5
Color Temperature		5500K	6500K	7500K	9300K
DLP Frame Rate	Auto	48Hz	50Hz	60Hz	
Color Gamut	Auto	REC709	SMPTE-C	EBU	Native DCI PCE
Constant Contrast	Low	Medium	High	Off	
Adaptive Contrast	On	Off			
RGB Adjust		Enter			
Fine Sync		Enter			
PCE		Enter			

Menu = Exit      Menu Select ◀▶      Scroll ▲▼

**Figure 4-8. Q-650i Advanced Menu**

**Color Space:** Select Color Space from the Advanced menu to choose the color space of the source signal for HDMI, RGB, and component connections.

- The default setting, **Auto**, functions as follows:
  - **HDMI:** If the Auxiliary Video Information (AVI) infoframe contains color space and/or range data, the Q-650i uses that information. Otherwise, for RGB sources, the Q-650i uses the RGB-Video color space. For component SDTV and EDTV resolutions, REC601 is used. For other component video resolutions, REC709 is used.
  - **RGB:** If Hsync or Vsync signals are present, the Q-650i uses the **RGB-PC** color space. Otherwise, **REC601** is used for SDTV and EDTV sources, and **REC709** for all other sources.
  - **Component:** For SDTV and EDTV resolutions, the Q-650i uses the **REC601** color space. For all other resolutions **REC709** is used.

In most cases, the **Auto** setting determines the correct color space to use. If it does not, you can force the Q-650i to use a specific color space. Choose one of the following:

- **REC709** sets the color space matrix to that defined in ITU-R BT.709.
- **REC601** sets the color space matrix to that defined in ITU-R BT.601.
- **RGB-PC** uses RGB color space and sets black at 0,0,0 RGB and white at 255,255,255 RGB, assuming an 8-bit image.
- **RGB-Video** uses RGB color space and sets black at 16,16,16 RGB and white at 235,235,235, assuming an 8-bit image, to correspond to the luminance values defined in digital component standards.

**Video Standard:** Select Video Standard from the Advanced menu to specify the color system for composite video or S-Video input signals.

Different countries use different formats for video signals. Select the appropriate Video Standard for your region:

- **Auto:** The color systems are automatically identified and the format is set accordingly.
- **PAL:** This is the standard used in Europe, Australia and many other parts of the world, typically with a 50Hz frame rate.
- **SECAM:** This is a standard format used mainly in France and Russia.
- **NTSC:** This is the standard format used mainly in the United States and Japan.

**Gamma:** Select Gamma from the Advanced menu to choose a DLP de-gamma curve. The available settings are 1.8, 2.0, 2.2, 2.35 and 2.5.

Used correctly, the Gamma control can improve contrast while maintaining good details for blacks and whites.

If excess ambient light washes out the image and it becomes difficult or impossible to see details in dark areas, lower the gamma setting to compensate. This improves contrast while maintaining good details for blacks. Conversely, if the image is washed out and unnatural, with excessive detail in black areas, increase the setting.

**Color Temperature:** Color temperature defines the “color of gray;” that is, adjusts the 75% white point to various color points.

To choose a color temperature setting, select Color Temperature from the Advanced menu. Then, press ◀ or ▶ to select **5500K**, **6500K**, **7500K** or **9300K**. The default setting, 6500K, is appropriate for most situations. Higher settings produce a “bluer” picture; lower ones impart a reddish hue to the image. Select **Native** to disable white point adjustment of the source signal.



**Note**

*The Color Temperature setting is unavailable when you choose the “PCE” Color Gamut setting (refer to **Color Gamut**, below).*

**DLP Frame Rate:** Select DLP Frame Rate from the Advanced menu to choose the output frame rate. You can have the Q-650i automatically determine the optimum frame rate, or you can force it to use a specific frame rate.



**Note**

*If PIP is active, the Q-650i converts the PIP source frame rate to the same frame rate as the main source.*

- The default setting, **Auto**, frame locks to the main source if it has a vertical refresh rate of between 48 and 62Hz. Vertical refresh rates of from 24 to 31Hz are doubled. Frame rates between 31 and 48Hz and greater than 62Hz are converted to 60Hz.
- Select **48Hz** to force the output frame rate to 48Hz. Use this setting to eliminate 2:3 pull-down judder with 60Hz film-based sources.
- **50Hz** and **60Hz** force the output frame rate to 50Hz and 60Hz respectively.



**Color Gamut:** Select Color Gamut from the Advanced menu to select a color gamut (range) that may be different from the default color gamut.

Each setting defines the precise hue of each primary (red, green and blue) and secondary (yellow, cyan and magenta) color component used to generate the millions of colors produced in displays. Changing either or both of these numbers changes the hue of the color and relocates the “triangle” for possible colors. For example, changing the x/y coordinates for red moves the color closer to either orange or violet, which in turn affects all displayed colors having a red component.

- **Auto** automatically chooses the appropriate color gamut:
  - **SMPTE-C** for NTSC, 480i and 480p sources.
  - **EBU** for PAL, SECAM, 576i and 576p sources.
  - **REC709** for all other sources.
- **REC709** chooses the REC709 color gamut.
- Select **SMPTE-C** to use the color gamut defined in SMPTE 170M-1999.
- Select **EBU** to use the color gamut defined in EBU Tech. 3213-E.
- Select **Native** for Runco's recommended Personal Color Equalizer preset for typical video sources. It displays the fully saturated LED color gamut with appropriate color brightness, hue, and Runco Smart Color settings.
- Select **DCI** to use the color gamut defined in Digital Cinema System Specification Version 1.2.
- Select **PCE** to use the Personal Color Equalizer feature of the Q-650i. PCE lets you define a custom color gamut. Refer to **PCE** on page 60 for instructions on how to do this.

Table 4-3 lists the x- and y-coordinates for each primary and secondary color component.

**Table 4-3. x/y Color Gamut Values**

Primary Color	Color Gamut Settings and Associated x/y Values							
	REC709		SMPTE “C”		EBU		DCI	
	x	y	x	y	x	y	x	y
Red	0.640	0.330	0.635	0.340	0.640	0.330	0.680	0.320
Yellow	0.419	0.505	0.421	0.506	0.418	0.502	0.425	0.548
Green	0.300	0.600	0.305	0.595	0.290	0.600	0.265	0.690
Cyan	0.225	0.329	0.228	0.326	0.220	0.329	0.205	0.360
Blue	0.150	0.060	0.155	0.070	0.150	0.060	0.150	0.060
Magenta	0.321	0.154	0.318	0.162	0.328	0.158	0.342	0.154

**Constant Contrast:** Select Constant Contrast from the Advanced menu to enable (**On**) or disable (**Off**) the Constant Contrast algorithm in the optical engine. Constant Contrast uses a dynamic LED driver that modulates light to the DMD based on the actual content of the video material. Runco recommends that you disable Constant Contrast before adjusting Brightness, Contrast or other image settings.

**Adaptive Contrast:** Adaptive Contrast enhancement expands the light and dark portions of an output image according to the mean luminance of the input image.

**RGB Adjust:** To remove any trace of color from the white areas of the projected image, choose RGB Adjust from the Advanced menu and press **ENTER**. This displays the RGB Adjust sub-menu, shown in Figure 4-9.

MAIN	ADVANCED	SYSTEM	CONTROL	LANGUAGE	SERVICE
	Red Offset			100	
	Green Offset			100	
	Blue Offset			100	
	Red Gain			100	
	Green Gain			100	
	Blue Gain			100	

Menu = Exit      Menu Select ◀▶      Scroll ▲▼

**Figure 4-9. RGB Adjust Sub-Menu**

- **Gain:** Use the Gain controls to correct color imbalances in the bright areas of the image. A good way to do this is to use a test pattern consisting mostly of solid white areas, such as an 80 IRE “window” pattern. If the white areas contain traces of red, green or blue, decrease the Gain for that color.
- **Offset:** Use the Offset controls in the RGB Adjust sub-menu to correct color imbalances in the dark areas of the image. A good way to do this is to use a test pattern consisting mostly of dark gray areas, such as a 30 IRE “window” pattern. If the gray areas contain traces of red, green or blue, decrease the Offset for that color.

The Gain controls increase or decrease the full-scale input range; the Offset controls shift the entire range, resulting in a change in brightness.



**Note**

*Generally, higher Gain settings reduce the image contrast; higher Offset settings reduce the image brightness.*

**Fine Sync:** To fine-tune the position and other image attributes, choose Fine Sync from the Advanced menu and press **ENTER**. This displays the Fine Sync sub-menu, shown in Figure 4-10.

MAIN	ADVANCED	SYSTEM	CONTROL	LANGUAGE	SERVICE
	V Position			100	
	H Position			100	
	Phase			100	
	Tracking			100	
	Sync Level			100	
Menu = Exit      Menu Select ◀ ▶      Scroll ▲ ▼					

**Figure 4-10. Fine Sync Sub-Menu**

- **V Position:** •This control adjusts the vertical position of the image within the designated image area, up to 25 per cent of the image height up or down.
- **H Position:** This control adjusts the horizontal position of the image within the designated image area, up to 25 per cent of the image width left or right.
- **Phase (RGB or Component sources):** This control adjusts the phase of the pixel sampling clock relative to the incoming signal. Adjust the phase when an RGB or Component image still shows shimmer or “noise” after Tracking has been optimized.



**Tip**

*Adjust the Phase after adjusting Tracking (see below). If some shimmer from a video or HDTV source persists, use the Noise Reduction controls (described on page 52) to remove high-frequency noise from the signal.*

For best results, use a good test pattern such as a smooth gray consisting of a clear pattern of black and white pixels, or a similar “half on, half off” graphic image. Adjust the slider until the image stabilizes and each pixel is clearly defined. You may notice that you can stabilize the image at more than one point. Use either setting in such cases.

- **Tracking (RGB or Component sources):** Tracking determines the frequency of the pixel sampling clock, indicated by the number of incoming pixels per line, so that all pixels generated by a particular source are sampled.

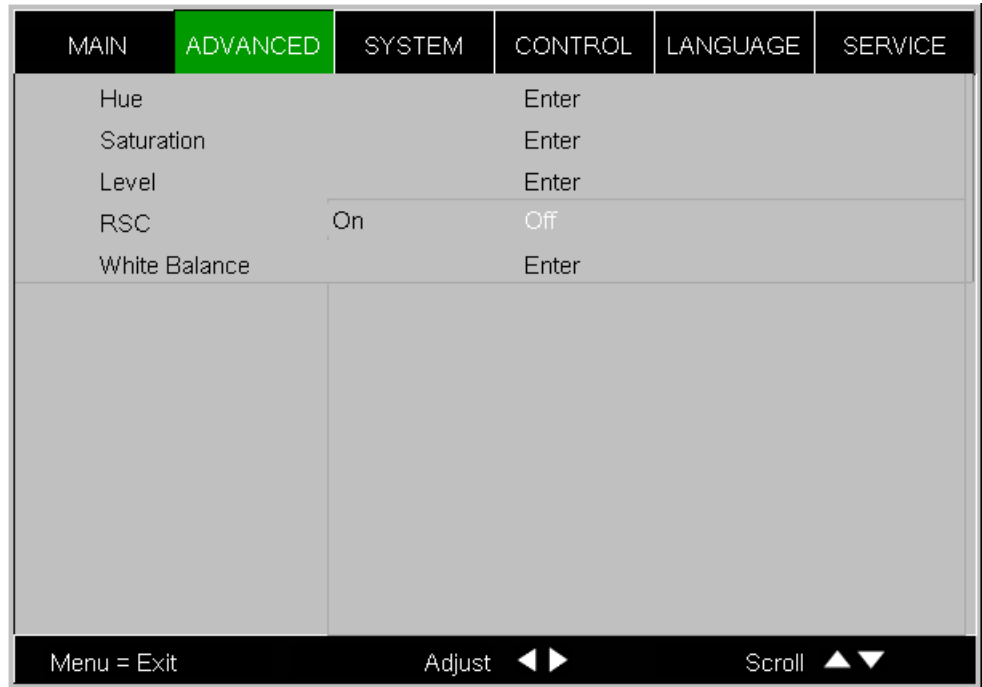
Steady flickering or several soft vertical stripes or bands across the entire image indicates poor pixel tracking. Proper pixel tracking helps ensure that the image quality is consistent across the screen, that aspect ratio is maintained and that pixel phase (see above) can be optimized.

- **Sync Level (Component sources only):** Select Sync Level to adjust the voltage level of the Q-650i Sync signal detection circuitry.

Sync Level adjustment is occasionally necessary when a DVD player or HDTV source signal drops “below black” (for example, during scenes with explosions or when subtitles are present) and causes the projector to temporarily lose sync. If the Sync Level from the source is persistently too low, the projector won’t sync with the source at all.

The range is from 50 to 256 millivolts (mV) inclusive. The default setting is 240 mV and should rarely require adjustment.

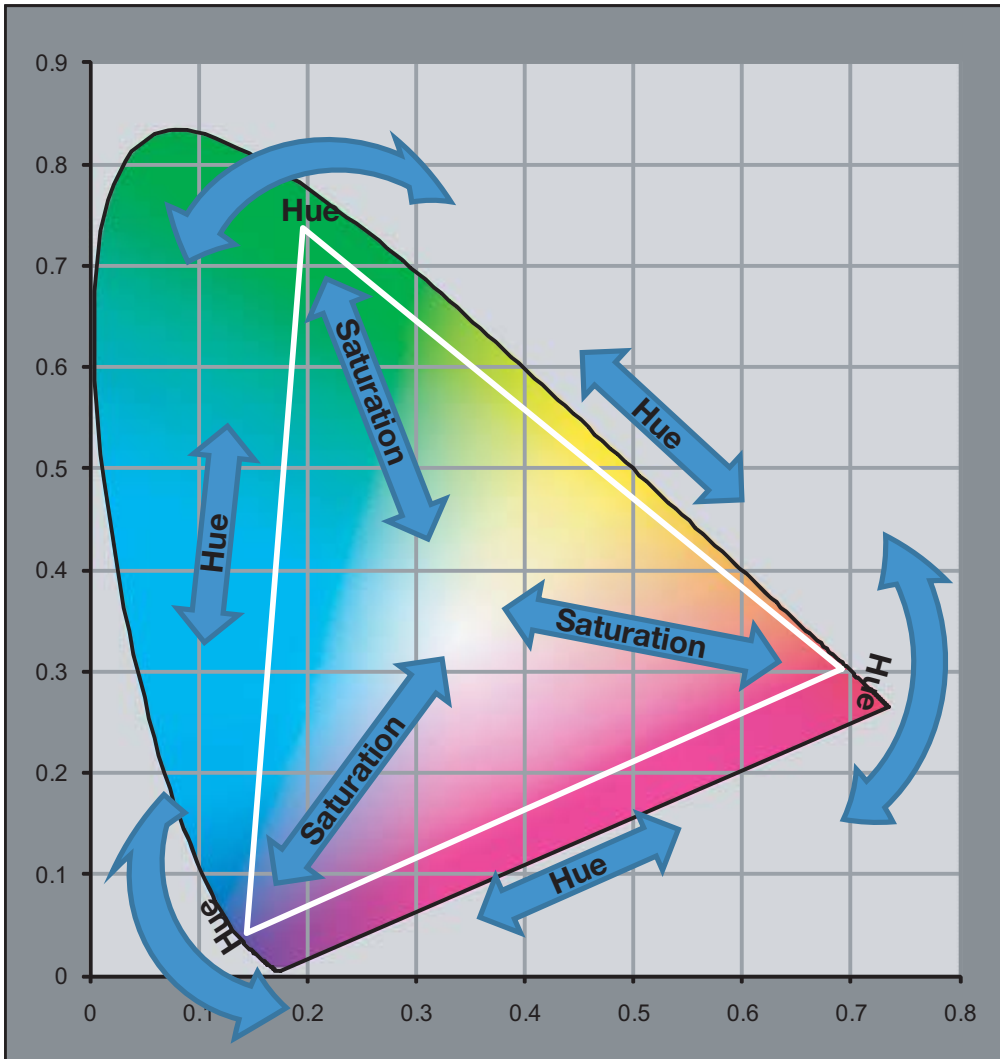
**PCE:** To use the Personal Color Equalizer to define a custom color gamut, choose the “PCE” Color Gamut setting (refer to **Color Gamut** on page 57). Then, choose PCE from the Advanced menu and press **ENTER**. This displays the PCE sub-menu, shown in Figure 4-11.



**Figure 4-11. PCE Sub-Menu**

**Hue/Saturation/Level:** PCE provides the ability to define a custom color gamut in terms of primary (red, green and blue) and secondary (yellow, cyan and magenta) color hues, saturation and level (brightness).

Each control operates only on the color specified. Surrounding colors are linearly interpolated based on their distance from each of these colors. In the CIE 1931 Yxy coordinate system (see Figure 4-12), Hue rotates the color coordinates around the white point, Saturation adjusts the coordinate's distance from white and Level adjusts the luminance (Y) of the color relative to white.

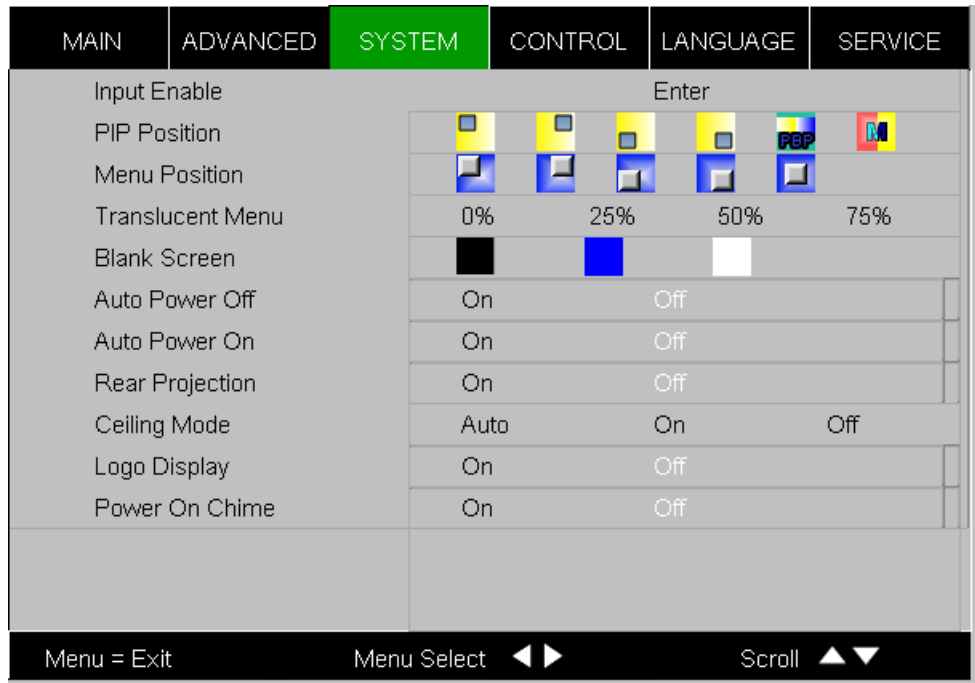


**Figure 4-12. CIE 1931 Color Coordinate Diagram and Effect of PCE Hue and Saturation Controls**

**RSC™ (Runco Smart Color):** Set RSC to On to improve the accuracy of flesh tones and increase color saturation, without sacrificing the purity of other colors.

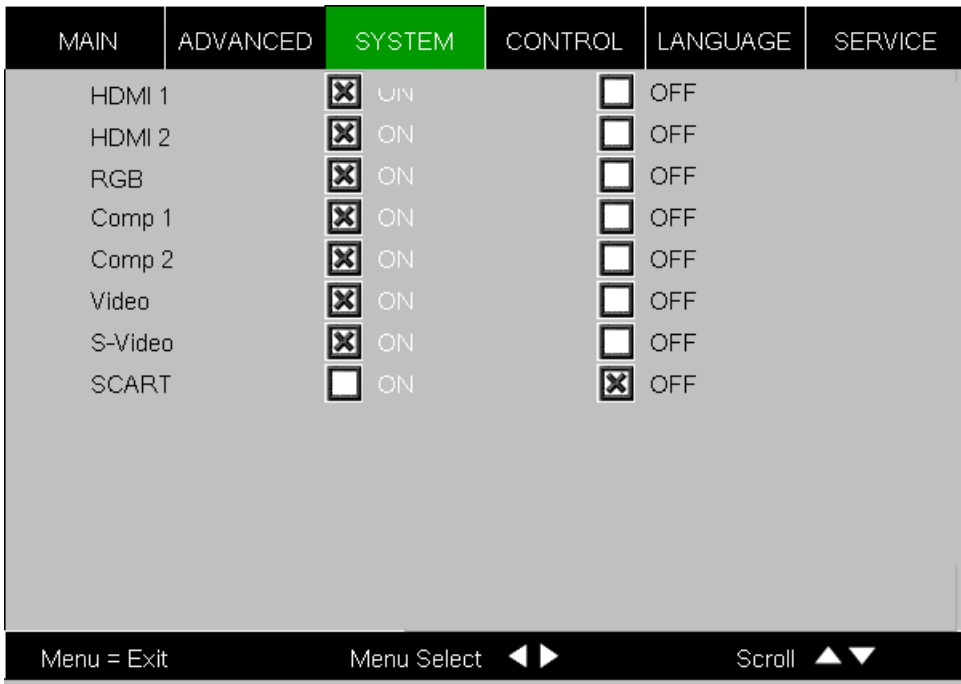
**White Balance:** To precisely adjust the white point associated with the custom color gamut, choose White Balance from the PCE sub-menu. These controls operate identically to the Gain controls in the RGB Adjust menu (described on page 58).

**System** ➤ Use the controls in the System menu, shown in Figure 4-13, to change the display orientation and perform other, common installation tasks.



**Figure 4-13. Q-650i System Menu**

**Input Enable:** To enable or disable selection of a source, choose Input Enable from the System menu and press **ENTER**. This displays the Source Enable sub-menu, shown in Figure 4-14.



**Figure 4-14. Input Enable Sub-Menu**

- **HDMI 1/HDMI 2:** Enables or disables the HDMI 1 and HDMI 2 sources.
- **RGB:** Enables or disables the RGB source.
- **Comp 1/Comp 2:** Enables or disables the Component 1 and Component 2 sources.
- **Video:** Enables or disables the Composite video source.



**Note**

*If either Component 1 or Video is enabled, SCART must be disabled.*

- **S-Video:** Enables or disables the S-Video source.
- **SCART:** Enables or disables the SCART RGBS source.



**Note**

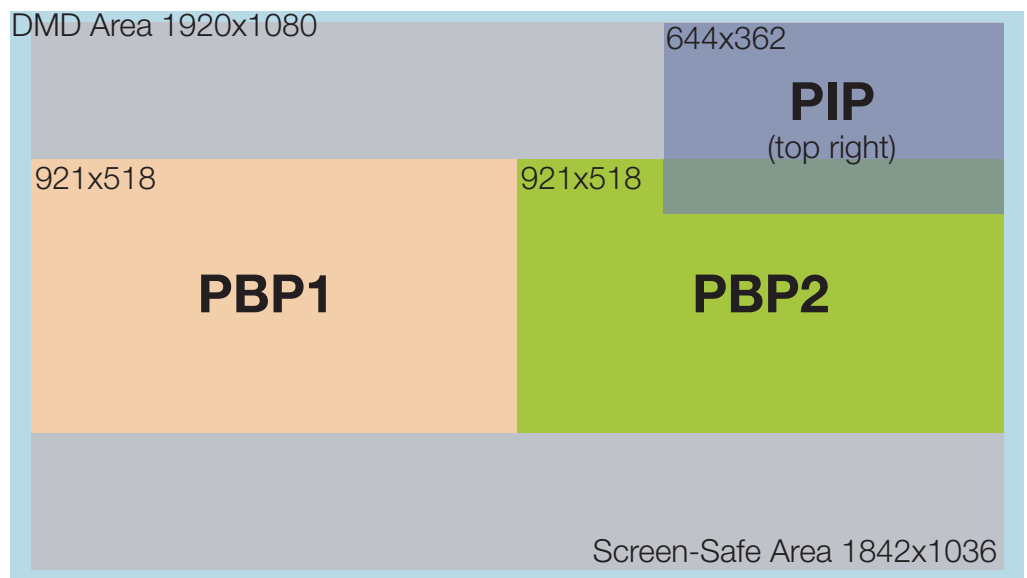
*If SCART is enabled, both Component 1 and Video must be disabled.*

**PIP Position:** To change the position of the PIP image, choose PIP Position from the System menu; see Figure 4-15. Choose one of the following:

- **Top Left:** This places the PIP source into a 644x362 designated image area at the top left of the screen.
- **Top Right:** This places the PIP source into a 644x362 designated image area at the top right of the screen.
- **Bottom Left:** This places the PIP source into a 644x362 designated image area at the bottom left of the screen-safe area of the DMD.

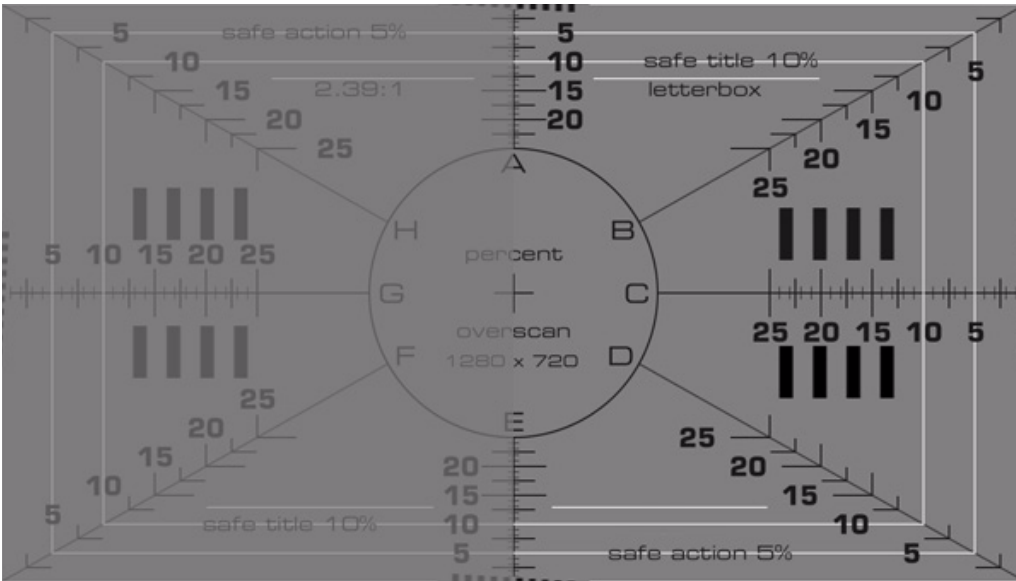
- **Bottom Right:** This places the PIP source into a 644x362 designated image area at the bottom right of the screen-safe area of the DMD.
- **Picture-By-Picture:** This reduces the designated image area of the Active source to 921x518 and places it next to the PIP source, which is also in a 921x518 image area. These two images are centered on the screen.
- **Split Screen:** This is a special mode in which the active source is also used as the PIP source and placed in a PIP area equal to half the display on the left side. This results in the right half of the image being the active source and the left half is the PIP source. The Q-650i applies the Custom 2 settings to the PIP image.

Split-screen mode is useful for viewing “before” and “after” settings for Sharpness, Noise Reduction and other advanced image parameters. See Figure 4-16.



**Figure 4-15. PIP and PBP areas for 1080p Display**





**Figure 4-16. PIP Split-Screen Mode**

**Menu Position:** Select Menu Position from the System menu to change the OSD menu position. The default setting is "☐" (top left).

**Translucent Menu:** Select Translucent Menu from the System menu to adjust the degree of translucence (show-through) in the menus and message boxes. 0% means that the menus are opaque. The default setting is 25%.

**Blank Screen:** Select Blank Screen from the System menu to choose the color of the blank screen that appears when no source signal is present. The options are Logo, Black, Blue and White. The default is Black.

**Auto Power Off:** Set Auto Power Off to **On** to have the Q-650i turn itself off after 20 minutes of inactivity (no source signal present).

**Auto Power On:** Setting Auto Power On to **On** causes the projector to automatically power up when AC power is present. If the projector is plugged into a switched AC outlet, this allows the projector to be turned on using a wall switch instead of the remote control unit. If you do not need this capability, set Auto Power On to **Off** (this is the default setting).

**Rear Projection:** This control reverses all images and menus, and is necessary when the projector is used in rear-projection applications. The default is **Off**.

**Ceiling Mode:** This control flips the image so the projector can be used in ceiling mounted installations. The default setting, **Auto**, automatically determines the orientation using an internal sensor.

**Logo Display:** This controls whether or not the Runco logo appears during startup.

**Power On Chime:** This controls the audible chime at startup.

**Control** ➤ Select Control from the Main Menu to set various options related to control of the projector.

MAIN	ADVANCED	SYSTEM	CONTROL	LANGUAGE	SERVICE
HD 1 Key			Enter		
HD 2 Key			Enter		
HD 3 Key			Enter		
CineWide		Off	CineWide	AutoScope	
Trigger-1		AutoScope	Lamp	4:3	RS232
Trigger-2		AutoScope	Lamp	4:3	RS232

Menu = Exit      Menu Select ◀▶      Scroll ▲▼

**HD 1 Key / HD 2 Key / HD 3 Key:** These menu items assign the function of the HD 1, HD 2 and HD 3 buttons on the remote.

There are eight sources corresponding to the eight connections to the projector. When you assign a source to a numbered key, the projector immediately goes to that source when the key assigned to it is pressed.

If the chosen source is disabled via the Input Enable menu (refer to page page 62), this setting has no effect.

**CineWide:** Select CineWide from the Control menu and set it according to the installed lens configuration, as follows:

- For a standard Q-650i (no anamorphic lens), choose **Off**.
- For a Q-650i/CineWide (fixed anamorphic lens), choose **CineWide**.
- For a Q-650i/CineWide with AutoScope (motorized anamorphic lens), choose **AutoScope**.

**Trigger 1:** Select Trigger 1 from the Control menu to specify when the Trigger 1 port outputs 12 volts. There is a three-second delay before activation to prevent operation while selecting an aspect ratio.

- **AutoScope** causes the port to output 12 volts whenever the the Cinema or Virtual Cinema aspect ratio is active.
- **Lamp** causes the port to output 12 volts whenever the lamp (LED RGB assembly) is on.
- **4:3** causes the port to output 12 volts whenever the 4:3 aspect ratio is chosen. The output stops if PIP is enabled (PIP source is set to anything other than off).
- **RS232** causes the port to output 12 volts when an RS232 screen trigger 1 “on” command is received and stop when a trigger 1 “off” command is received. The 12 volt output also stops when the projector is turned off.

**Trigger 2:** Select Trigger 2 from the Control menu to configure the Trigger 2 output. Trigger 2 operates identically to Trigger 1.

Select Language from the Main Menu to change the OSD Language.

◀ **Language**

The Q-650i can display the menus in English, French, German, Italian, Spanish, Swedish, Portuguese or Russian.



Press ▲ or ▼ to select a language. Then, press **ENTER** to confirm your selection.

**Service** ➤ Access the Service Menu, shown in Figure 4-17, to view information that uniquely identifies your projector and indicates its current operational status:

- Model Name
- Unit Serial Number
- Software Version
- LED Driver Version
- Active/PIP Source
- Pixel Clock
- Signal Format
- H/V Refresh Rate

Should you ever need to contact Runco Technical Support, this information will help them answer your questions and/or resolve product performance issues.

MAIN	ADVANCED	SYSTEM	CONTROL	LANGUAGE	SERVICE
MODEL NAME :			Q-650		
Serial Number :			XXXXXXXXXXXXXXXX		
Software Version :			MP08-GP02-2015		
LED Driver Version :			2.2.40		
Active/PIP source :			HDMI1 / Off		
Pixel Clock :					
Signal Format :			Searching for source		
H/V Refresh Rate :					
Factory Reset			Enter		
Blue Only			On	Off	
Test Patterns			On	Off	
Altitude			Auto	High	
Menu = Exit      Menu Select ◀▶      Scroll ▲▼					

**Figure 4-17. Q-650i Service Menu**

You can also perform various maintenance tasks from this menu.

**Factory Reset:** Select Factory Reset from the Service menu to restore all projector settings – except those listed below – to their factory-default values:

- Custom 1 / Custom 2
- ISF Day
- ISF Night
- Model Name / Serial Number
- Language

**Blue Only:** This feature removes all red and green color information from the image, and is useful for color-calibrating the projector or other video components.

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**Test Patterns:** The Q-650i has numerous internal test patterns that are useful to technicians for advanced calibration, measurement and fault isolation purposes. To access them, select Test Patterns from the Service menu and set it to **On**.

The available test patterns are:

- White
- Black
- Red
- Green
- Blue
- Cyan
- Magenta
- Yellow
- ANSI Checkerboard
- Horizontal Gray Ramp
- Focus Grid

Press ◀ or ▶ on the remote control unit or built-in keypad to cycle through the test patterns.

**Note**

*The OSD menus are not available when in “test pattern” mode.*

To turn test patterns off, press any key other than ◀ or ▶ on the remote control unit or built-in keypad.

**Altitude:** Select Altitude from the Service Menu to control the operation of the projector’s cooling fan.

In most cases, the default setting (**Auto**) maintains the correct operating temperature. If the projector frequently turns off due to overheating, or in certain high-altitude operating environments, you may need to change this setting to **High**.

**Notes:**

# 5. Maintenance and Troubleshooting

Table 5-1 provides some general guidelines for troubleshooting problems you may encounter with the Q-650i. If the suggested solutions fail to resolve the problem or if you encounter an issue not described here, please contact Runco Technical Support.

## 5.1 Troubleshooting Tips

**Table 5-1. Troubleshooting Chart**

Symptom	Possible Cause(s)	Solution
The projector does not turn on.	<ul style="list-style-type: none"> <li>The Q-650i is not plugged in or the AC outlet is not active.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the Q-650i is plugged in and that the AC outlet is active.</li> </ul>
The remote control does not work correctly.	<ul style="list-style-type: none"> <li>The batteries have run out.</li> </ul>	<ul style="list-style-type: none"> <li>Replace the batteries.</li> </ul>
The projector is on and OSD menus appear, but there is no video image on-screen.	<ul style="list-style-type: none"> <li>Incorrect source selection.</li> <li>Source component is not turned on.</li> <li>Source component is connected incorrectly or not at all.</li> </ul>	<ul style="list-style-type: none"> <li>Select the correct source.</li> <li>Turn on the source.</li> <li>Check cable connection from source component to projector.</li> </ul>
A projected image from a DVD is split or otherwise scrambled.	<ul style="list-style-type: none"> <li>DVD player is connected to the Component input and set to progressive scan mode.</li> </ul>	<ul style="list-style-type: none"> <li>Turn off progressive scan on the DVD player.</li> </ul>
Image is blurred.	<ul style="list-style-type: none"> <li>The lens is not correctly focused.</li> </ul>	<ul style="list-style-type: none"> <li>Adjust the focus.</li> </ul>
Image is too bright and/or lacks definition in the bright areas of the image.	<ul style="list-style-type: none"> <li>Contrast is set too high.</li> </ul>	<ul style="list-style-type: none"> <li>Lower the contrast setting.</li> </ul>
Image geometry is incorrect.	<ul style="list-style-type: none"> <li>Incorrect aspect ratio selection.</li> </ul>	<ul style="list-style-type: none"> <li>Select the aspect ratio that best matches the source image and screen size (refer to Table 4-2).</li> </ul>
Image appears "washed out" and/or dark areas appear too bright.	<ul style="list-style-type: none"> <li>Brightness is set too high.</li> </ul>	<ul style="list-style-type: none"> <li>Lower the brightness setting.</li> </ul>
Colors in the image are swapped; for example, reds appear blue or vice versa.	<ul style="list-style-type: none"> <li>The Red/Pr, Green/Y or Blue/Pb outputs from the source are connected to the wrong inputs on the Q-650i.</li> </ul>	<ul style="list-style-type: none"> <li>Ensure that the source outputs are connected to the correct Q-650i input.</li> </ul>

**Note:** You can obtain more detailed information about the cause of the error condition using RS-232 commands. Refer to **RS-232 Error Codes** on page 83 for more information.

**Table 5-1. Troubleshooting Chart (continued)**

Symptom	Possible Cause(s)	Solution
RGB-HD images appear “noisy.”	<ul style="list-style-type: none"> <li>Tracking and Phase settings need adjustment.</li> </ul>	<ul style="list-style-type: none"> <li>Manually adjust Tracking and Phase settings (refer to <b>Fine Sync</b> on page 59).</li> </ul>
LED is flashing red.	<ul style="list-style-type: none"> <li>Q-650i internal temperature is too high (Note).</li> </ul>	<ul style="list-style-type: none"> <li>Power off the Q-650i and allow it to cool down. Ensure that the intake and exhaust vents are not blocked. Turn the projector back on. If the problem persists, please contact Runco Technical Support for assistance.</li> </ul>
LED lights solid red.	<ul style="list-style-type: none"> <li>Fans are not working properly or power-on self-test has failed (Note).</li> </ul>	<ul style="list-style-type: none"> <li>Power off the Q-650i and allow it to cool down. Turn the projector back on. If the problem persists, please contact Runco Technical Support for assistance.</li> </ul>
<p><b>Note:</b> You can obtain more detailed information about the cause of the error condition using RS-232 commands. Refer to <b>RS-232 Error Codes</b> on page 83 for more information.</p>		



# 6. Serial Communications

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To interface the Q-650i with a home theater automation/control system or a PC running terminal emulation software:

1. Connect it to your control system or PC as shown in Figure 3-14.
2. Start a terminal session on your PC using a terminal-emulation program, such as HyperTerminal.
3. Configure the RS-232 controller or PC serial port as follows: 38400 bps, no parity, 8 data bits, 1 stop bit and no flow control.
4. Type **ky** or **op** followed by a command from among those listed in Table 6-1 or Table 6-2 and press **<Enter>**. For example, to change the aspect ratio to Letterbox, type **op aspect = 1<Enter>**.

Serial commands to the Q-650i take the following form:

- Commands are in ASCII format.
- Spaces and tabs can be used to improve readability and are ignored by the projector.
- All commands must end with a carriage return (ASCII hex 0D) to signify that the projector can now read and execute the command.
- Commands are not case-sensitive.

The Q-650i supports two types of commands: key commands and operation commands. Key commands mimic pressing a button on the remote control. Operation commands tell the projector exactly what to do.

All commands start with 2 letters:

**ky** for key commands.

**op** for operations commands.

The syntax for key commands is simple:

**ky <keyname>[CR]**

Some key command examples:

**ky menu[CR]** Bring up or cancel menu display.

**ky mem.sw[CR]** Switch to next user memory.

**ky asp.16.9[CR]** Apply 16:9 aspect ratio.

The response from the projector for key commands will be the same command in UPPERCASE.

Input: **ky mem.sw[CR]**

Response: **KY MEM.SW [CR]**

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## 6.1 RS-232 Connection and Port Configuration




















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## 6.2 Serial Command Syntax
























### ◀ Key Commands

Table 6-1 lists the serial command key names and IR codes.




**Table 6-1. Serial Command Key Names and IR Codes**

IR Code	RS232 Keyname	Remote Button	Description
0x00	pow.on		Turn power on.
0x45	pow.off		Turn power off.
0x02	src.video		Switch the active source to Video.
0x1f	src.svid		Switch the active source to S-Video.
0x0a	src.hdmi1		Switch the active source to HDMI 1.
0x50	src.hdmi2		Switch the active source to HDMI 2.
0x1e	src.1		Switch the active source to Component 1.
0x40	src.2		Switch the active source to Component 2.
0x58	src.3		Switch the active source to RGB.
0x1b	info		Bring up an information box with the first 7 items in the Service menu.
0x19	menu		Bring up or cancel menu display.
0x5c	exit		Exit all menus.
0x51	enter		Keypad enter. If PIP is active and no menu is present then this will execute the PIP swap function
0x1d	cur.down		Keypad down arrow.
0x44	cur.up		Keypad up arrow.
0x1c	cur.left		Keypad left arrow. If no menu is present then this will change the PIP source.
0x48	cur.righ		Keypad right arrow. If no menu is present then this will change the PIP source.
0x06	bright		Bring up or cancel brightness slider.
0x05	contrast		Bring up or cancel contrast slider.

**Table 6-1. Serial Command Key Names and IR Codes (continued)**

IR Code	RS232 Keyname	Remote Button	Description
0x04	color		Bring up or cancel color slider.
0x03	tint		Bring up or cancel tint slider.
0x5f	isf.nigh		Changes to ISF Night preset.
0x07	isf.day		Changes to ISF Day preset.
0x4b	mem.1		Changes to Custom 1 preset.
0x4a	mem.2		Changes to Custom 2 (THX) preset.
0x42	asp.16.9		Apply 16:9 aspect ratio to the active source.
0x46	asp.4.3		Apply 4:3 aspect ratio to the active source.
0x52	asp.lett		Apply Letterbox aspect ratio to the active source.
0x43	asp.vwide		Apply VirtualWide aspect ratio to the active source.
0x01	asp.cin		Apply Cinema aspect ratio to the active source.
0x47	asp.vcin		Apply VirtualCinema aspect ratio to the active source.
0x08	1		The projector does not respond to this key.
0x0c	2		The projector does not respond to this key.
0x0d	3		The projector does not respond to this key.
0x0e	4		The projector does not respond to this key.
0x0f	5		The projector does not respond to this key.
0x14	6		The projector does not respond to this key.
0x15	7		The projector does not respond to this key.
0x16	8		The projector does not respond to this key.
0x17	9		The projector does not respond to this key.
0x18	0		The projector does not respond to this key.
0x12	(none)		The projector does not respond to this key.

**Table 6-1. Serial Command Key Names and IR Codes (continued)**

IR Code	RS232 Keyname	Remote Button	Description
0x10	(none)		The projector does not respond to this key.
0x13	(none)		The projector does not respond to this key.
(none)	(none)		Activates remote backlighting when pressed.

**Operations Commands** ➤ Operations commands allow more flexible and direct control of the projector. The syntax for operations commands is as follows:

**op <operation> <command>[CR]**

(Precede <operation> and <command> with a space.)

The command type can be one of 5 functions:

Operations Control Commands		
Function	Command	Description
Set	= <value>	Assigns that value to the parameter.
Get	?	Returns the current value of that parameter.
Increment	+	Adds 1 to the current value.
Decrement	-	Subtracts 1 from the current value.
Execute	(none)	Performs an action such as a reset.

Table 6-2 lists the valid operations commands. For all but Execute functions, the response from the projector is the command and “= <value>” where <value> is the current value or “NA” if the value is not available. For Execute functions the response is the same command. All responses are in UPPERCASE.

Some operations command examples:

Input: **op bright ? [CR]**

Response: **OP BRIGHT = 100 [CR]**

Input: **op bright + [CR]**

Response: **OP BRIGHT = 101 [CR]**

Input: **op bright = 127 [CR]**

Response: **OP BRIGHT = 127 [CR]**

Input: **op bright - [CR]**

Response: **OP BRIGHT = 126 [CR]**

Input: **op resync [CR]**

Response: **OP RESYNC [CR]**

Input: `op sharp.mode = 1 [CR]`

Response: `OP SHARP.MODE = 1 [CR]`

Input: `op sharp.simple = 50 [CR]`

Response: `OP SHARP.SIMPLE = NA [CR]`

Input: `op sharp.simple ? [CR]`

Response: `OP SHARP.SIMPLE = NA [CR]`

The last three commands show what happens when a control is grayed out. In this case, the sharpness mode was set to advanced (value = 1) and then the simple sharpness slider was attempted to be adjusted and queried. The response was “NA” or not available.

**Table 6-2. Serial Commands**

Operation	Commands	Values	Notes
aspect	= ?	0 = 16:9 1 = Letterbox 2 = 4:3 3 = VirtualWide 4 = Cinema 5 = VirtualCinema	
memory	= ?	0 = Custom 1 1 = Custom 2 2 = ISF Day 3 = ISF Night 4 = Default	? returns a value only if ISF Day or ISF Night is active, otherwise it returns NA.
save.mem	=	0 = Custom 1 1 = Custom 2	
save.isf	=	0 = ISF Day 1 = ISF Night	
bright contrast saturat tint sharp nr	= ? + -	0 - 200	
overscan	= ?	0 = Off 1 = Crop 2 = Zoom	
source.sel	= ?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = Component 1 4 = Component 2 5 = S-Video 6 = Video 7 = SCART	

**Table 6-2. Serial Commands (continued)**

Operation	Commands	Values	Notes
pip.select	= ?	0 = Off 1 = HDMI 1 2 = HDMI 2 3 = RGB 4 = Component 1 5 = Component 2 6 = S-Video 7 = Video 8 = SCART	
resync	(execute)		
color.space	= ?	0 = Auto 1 = REC709 2 = REC601 3 = RGB-PC 4 = RGB-Video	
video.stand	= ?	0 = Auto 1 = NTSC 2 = PAL 3 = SECAM	
gamma	= ?	0 = 1.8 1 = 2.0 2 = 2.2 3 = 2.35 4 = 2.5	
color.temp	= ?	0 = 5500K 1 = 6500K 2 = 7500K 3 = 9300K	
dlp.frame	= ?	0 = Auto 2 = 48 Hz 3 = 50 Hz 4 = 60 Hz	
color.gamut	= ?	0 = Auto 1 = REC709 2 = SMPTE C 3 = EBU 4 = Native 5 = DCI 6 = PCE (custom)	
ccont	= ?	0 = Off 1 = Low 2 = Medium 3 = High	ConstantContrast

**Table 6-2. Serial Commands (continued)**

Operation	Commands	Values	Notes
red.off green.off blue.off	= ? + -	0-200	Red/Green/Blue Offset
red.gain green.gain blue.gain	= ? + -	0-200	Red/Green/Blue Gain
vert.pos	= ? + -	0-200	
horiz.pos	= ? + -	0-200	
phase	= ? + -	0-200	
tracking	= ? + -	0-200	
sync.level	= ? + -	0-200	
pip.pos	= ?	0 = Top left 1 = Top right 2 = Bottom left 3 = Bottom right 4 = Picture by picture 5 = Split screen	
menu.pos	= ?	0 = Top left 1 = Top right 2 = Bottom left 3 = Bottom right 4 = Center	
trans.menu	= ?	0 = 0% 1 = 25% 2 = 50% 3 = 75%	Translucent Menu
blank.screen	= ?	0 = Black 1 = Blue 2 = White	
auto.pow.off	= ?	0 = Off 1 = On	
auto.pow.on	= ?	0 = Off 1 = On	
rear.proj	= ?	0 = Off 1 = On	
ceil.mode	= ?	0 = Off 1 = On 2 = Auto	
logo.disp	= ?	0 = Off 1 = On	

**Table 6-2. Serial Commands (continued)**

Operation	Commands	Values	Notes
1.key 2.key 3.key	= ?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = YPrPb 1 4 = YPrPb 2 5 = S-video 6 = Video 7 = SCART	HD 1/HD 2/HD 3 key source assignments.
trig.1 trig.2	= ?	0 = Lamp 3 = 4:3 4 = AutoScope 5 = RS232 6 = On 7 = Off	
model.name	?	<string>	
ser.number	?	<string>	
soft.version	?	<string>	
act.source	?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = Component 1 4 = Component 2 5 = S-video 6 = Video 7 = SCART	
pip.source	?	0 = HDMI 1 1 = HDMI 2 2 = RGB 3 = Component 1 4 = Component 2 5 = S-video 6 = Video 7 = SCART	
h.refresh	?	<number>	kHz
v.refresh	?	<number>	Hz
pixel.clock	?	<number>	MHz
signal	?	<string>	
total.hours	?	<number>	
environment	?	<string>	temperatures
fact.reset	(execute)		



**Table 6-2. Serial Commands (continued)**

Operation	Commands	Values	Notes
blue.only	=	0 = Off 1 = On	
pattern	=	0 = White 1 = Black 2 = Red 3 = Green 4 = Blue 5 = Cyan 6 = Magenta 7 = Yellow 8 = ANSI Checker-board 9 = Horizontal Gray Ramp 10 = Focus Grid 11 = Off	
language	= ?	0 = English 1 = French 2 = German 3 = Italian 4 = Spanish 5 = Swedish 10 = Portuguese 11 = Russian	OSD language only.
cinewide	= ?	0 = Off 1 = CineWide 2 = AutoScope	
altitude	= ?	0 = auto 1 = high	
red.hsg.hue yellow.hsg.hue green.hsg.hue cyan.hsg.hue blue.hsg.hue magenta.hsg.hue red.hsg.sat yellow.hsg.sat green.hsg.sat cyan.hsg.sat blue.hsg.sat magenta.hsg.sat	= ? + -	0-200	Personal Color Equalizer (PCE) "Hue" and "Saturation" settings.
red.hsg.gain yellow.hsg.gain green.hsg.gain cyan.hsg.gain blue.hsg.gain magenta.hsg.gain	= ? + -	0-200	PCE "Level" settings.

**Table 6-2. Serial Commands (continued)**




















Operation	Commands	Values	Notes
white.red.gain white.green.gain white.blue.gain	= ? + -	0-200	PCE "White Balance" settings.
hue.correct	= ?	0 = Off 1 = On	Runco Smart Color (RSC)
status	?	0 = Standby 1 = Powering Up 2 = Displaying 3 = Cooling Down 4 = Error	
errcode	?	Refer to <b>RS-232 Error Codes</b> , below.	
msgbox	= ?	0 = On 1 = Off	This control enables or disables the display of power off, source and adjustment message boxes (brightness, contrast etc.). Default value is ON.

If an **errcode ?** command returns one of the following values, you have encountered a likely system error requiring the attention of a qualified service technician. Try resetting the projector by powering it off, allowing it to cool and powering it on again. Refer to Table 6-3 and contact your dealer if the problem persists.

### ◀ RS-232 Error Codes

The specific code number identifies the source of the error detected, and is particularly useful in cases where the projector is far away. For example, the code “7” means that Fan 1 has failed.

**Table 6-3. RS-232 Error Codes**

Error Code	LED Indication	Description
0		Inlet NTC thermal sensor is over temperature.
1		Outlet NTC thermal sensor is over temperature.
2		Red LED thermal sensor is over temperature.
3		Green LED thermal sensor is over temperature.
4		Blue LED thermal sensor is over temperature.
6		Fan failure upon system power-up.
7		Fan 1 failed.
8		Fan 2 failed.
9		Fan 3 failed.
10		Fan 4 failed.
11		Fan 5 failed.
12		Fan 6 failed.
15		DDP3021 communication failure upon system power-up.
19		PCF8575 external GPIO communication failure.
21		Genum SPI communication failure upon system power-up.
22		System hardware I2C communication failure.
23		System software I2C communication failure.
24		EEPROM checksum error.
25		EDID checksum error.

**Notes:**

# 7. Specifications

Table 7-1 lists the Q-650i specifications.

**Table 7-1. Q-650i Specifications**

<b>Projector Type:</b>	Digital Light Processing™ (DLP™), Single-Chip, 16:9 SuperOnyx™ DMD™ with InfiniLight™ Illumination
<b>Illumination:</b>	RGB InfiniLight™ LEDs for 135% NTSC color gamut with Runco Smart Color™ and Personal Color Equalizer™
<b>Native Resolution:</b>	Full HD, 1920 x 1080 (16:9)
<b>Aspect Ratios:</b>	4:3, Letterbox, 16:9, VirtualWide, Cinema, Virtual Cinema
<b>Video Standards:</b>	HDMI and DVI with HDCP for digital video, Component and RGB HDTV (1080p, 1080i, 720p), Component and RGB EDTV (576p, 480p), Component, Composite and S-Video SDTV (576i, 480i), RGB SCART with adapter, NTSC (M,4,43), PAL (B,G,H,I,N,M), SECAM (M)
<b>Video Compatibility:</b>	480i, 480p, 576i, 576p, 720p, 1080i 50/60, 1080p 24/50/60
<b>Picture Size (16:9 Screen):</b>	Recommended Width: 72 in. (1.83 m) to 92 in. (2.34 m) Maximum Width: 108 in. (2.74 m)
<b>Throw Distance (Factor x Screen Width):</b>	Refer to Table 3-3
<b>Vertical Offset:</b>	<b>Standard Q-650i</b> - 60% of screen height above or below lens center (120% of one half of the screen height) <b>Q-650i/CineWide or Q-650i/CineWide with AutoScope</b> - 25% of screen height (50% of one half of the screen height) above or 60% of screen height (120% of one half of the screen height) below lens center, when projector is inverted
<b>Horizontal Offset:</b>	12.5% of screen width left or right of lens center (25% of one half of the screen width)
<b>Video Inputs:</b>	(2) HDMI; (2) Component (RCA, BNC); (1) RGB (HD15); (1) S-video; (1) Composite; (1) RS-232; (1) IR Repeater
<b>Control Options:</b>	<ul style="list-style-type: none"> <li>- Discrete IR remote</li> <li>- Serial commands via RS-232</li> </ul>
<b>RS-232 Communication Parameters:</b>	38400 bps, no parity, 8 data bits, 1 stop bit, no flow control
<b>+12V Outputs:</b>	Max. 0.25 Amps, programmable; Tip = +12V; Sleeve = Ground

## 7.1

### Q-650i Specifications

**Table 7-1. Q-650i Specifications (continued)**

<p><b>Brightness and Contrast:</b></p>	<p><b>Cinema Standards Measurement System (CSMS) Specifications</b></p> <ul style="list-style-type: none"> <li>- Brightness: 29 foot-Lamberts (fL)</li> <li>- Contrast Ratio: 330:1</li> </ul> <p>These measurements are taken from the projector in a controlled, home theater environment. All measurements are made to ANSI/NAPM IT7.228-1997 specifications using the Photo Research PR-650 SpectraColorimeter and Minolta LS-100 Luminance Meter, Video Essentials test DVD and a 1.3 gain, 72-inch wide screen. The projector is calibrated to a color temperature of 6,500K and has a minimum of 150 hours of usage.</p> <p>The foot-Lambert (fL) is the unit of measurement used in commercial movie theaters to express image brightness at the screen surface. The Society of Motion Picture and Television Engineers (SMPTE) specifies 16 fL as the target image brightness for film-based projectors using an open gate (without film in the projector). More importantly, today SMPTE specifies 12 fL as the target image brightness in Digital Cinema theaters. The foot-Lambert measurement is dependent on screen size, screen gain and projector light output.</p> <p><b>Home Theater Calibration Specifications</b></p> <ul style="list-style-type: none"> <li>- Light Output: 450 ANSI Lumens</li> <li>- Contrast Ratio: 330:1</li> </ul> <p>These specifications are obtained by calibrating the projector as described above for CSMS measurements.</p> <p><b>Industry-Standard Specifications</b></p> <ul style="list-style-type: none"> <li>- Light Output: 700 ANSI Lumens</li> <li>- Contrast Ratio: 3 settings (Infinity:1, 20,000:1, 10,000:1 (sequential))</li> </ul> <p><b>ColorContrast™</b></p> <p>Colors have up to 50% higher contrast than Mercury or Xenon lamp systems.</p> <p>These are typical projector brightness and contrast specifications found in most companies' sales literature. Runco includes these measurements in its literature to allow for direct comparison with other manufacturers' projectors. These measurements are typically taken at 9,000K to 13,000K to get expected performance data when the projector is used in professional, commercial and industrial displays.</p>
<p><b>Power Requirements:</b></p>	<p>100 to 240 VAC (auto-sensing), 50/60 Hz, 140 Watts typical (477.8 BTUs/hour)</p>
<p><b>Operating Environment:</b></p>	<p>50°F to 104°F (10°C to 40°C), 0% to 85% humidity (non-condensing)</p>
<p><b>Dimensions:</b></p>	<p><b>Q-650i:</b> See Figure 7-1  <b>Q-650i/CineWide with AutoScope:</b> See Figure 7-2</p>
<p><b>Weight (including lens):</b></p>	<p>49.4 lbs. (22.4 kg)</p>
<p><b>Regulatory Approvals:</b></p>	<p>FCC Part 15 Class B, CE Class B, UL, cUL, CB, RoHS, WEEE, local conformances as required</p>
<p><b>Limited Warranty:</b></p>	<p>Two (2) years parts and labor from the date of delivery to the end user.</p>
<p><b>Maintenance:</b></p>	<p>Zero maintenance, solid state optical path.</p>
<p><b>Specifications are subject to change without notice.</b></p>	

Figure 7-1 shows the Q-650i dimensions (all dimensions are in millimeters and [inches]).

## 7.2 Overall Dimensions – Q-650i

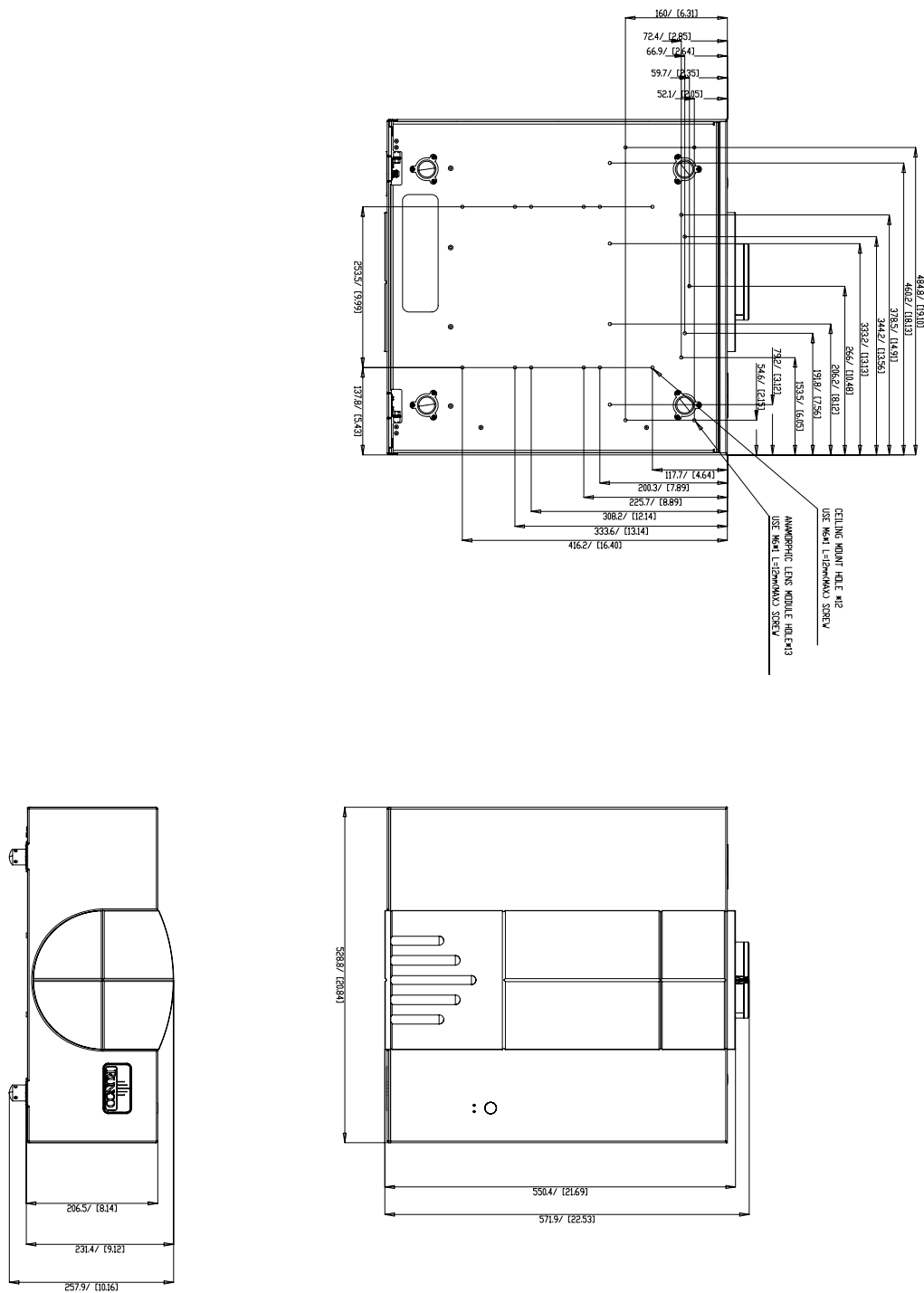


Figure 7-1. Overall Dimensions – Q-650i

### 7.3 Overall Dimensions – Q-650i/CineWide with AutoScope

Figure 7-2 shows the Q-650i/CineWide with AutoScope dimensions (all dimensions are in millimeters and [inches]).

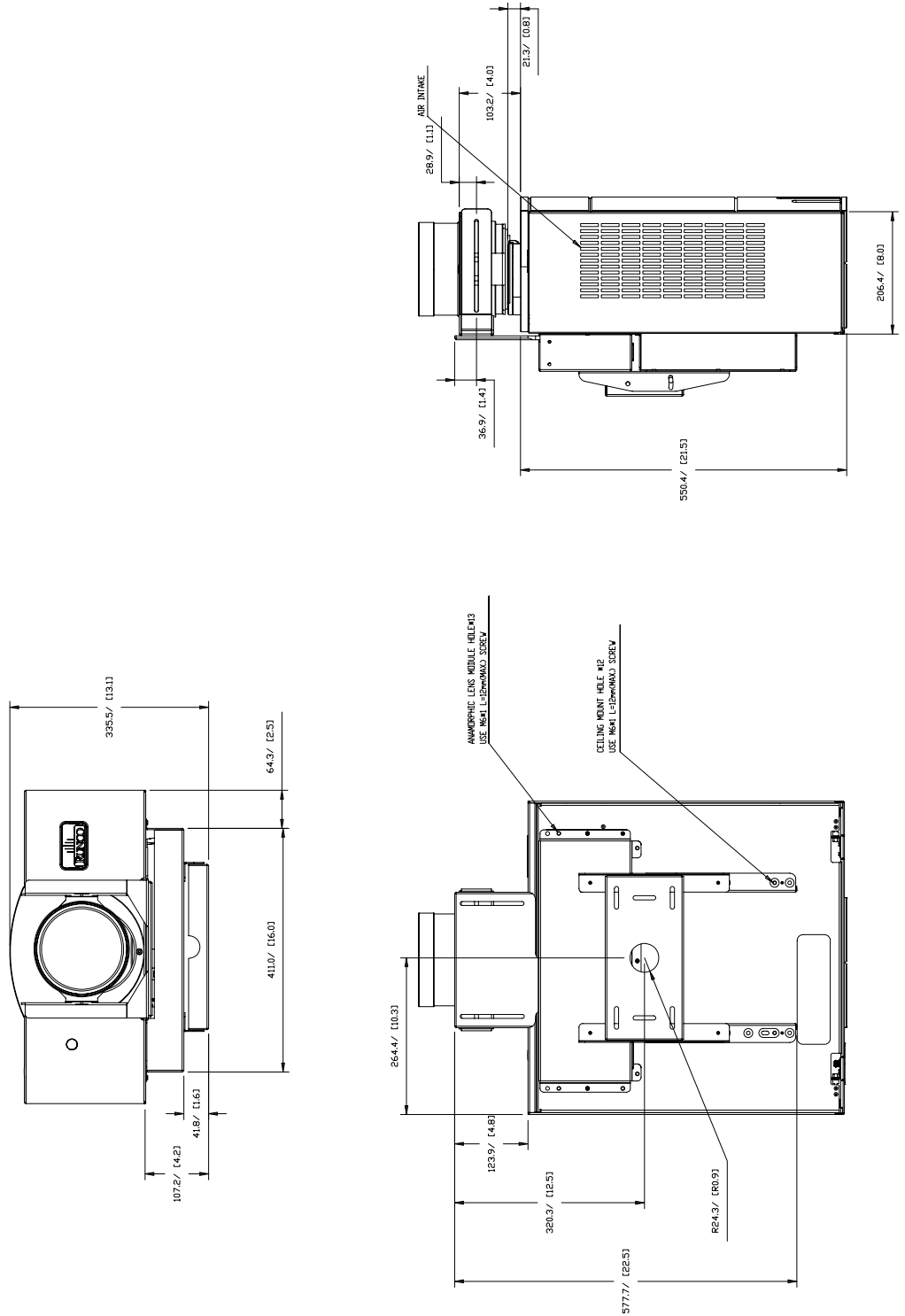


Figure 7-2. Overall Dimensions – Q-650i/CineWide with AutoScope



Table 7-2 lists the signal types supported by each input on the Q-650i.

## 7.4 Supported Timings

**Table 7-2. Supported Signal Timings by Input**

Format	Resolution	Refresh Rate (Hz)	Horizontal Frequency (kHz)	Pixel Frequency (MHz)	Supported? (√ = Yes, – = No)			
					RGB	Component 1 Component 2	HDMI 1 HDMI 2	Composite S-Video
640x480	640x480	60.00	31.469	25.175	√	–	√	–
		66.59	35.892	29.862	√	–	√	–
		75.00	37.500	31.500	√	–	√	–
		85.00	43.269	36.000	√	–	√	–
800x600	800x600	60.00	37.879	40.000	√	–	√	–
		75.00	46.875	49.500	√	–	√	–
		85.00	53.674	56.250	√	–	√	–
832x624	832x624	74.54	52.849	60.036	√	–	√	–
848x480	848x480	48.00	25.270	27.089	√	–	√	–
		60.00	31.020	33.750	√	–	√	–
1024x768	1024x768	60.00	48.363	65.000	√	–	√	–
		75.00	60.023	78.750	√	–	√	–
		85.00	68.677	94.500	√	–	√	–
1280x720	1280x720	47.95	37.833	64.769	√	–	√	–
1280x1024	1280x1024	60.00	63.981	108.000	√	–	√	–
		75.00	79.976	135.000	√	–	√	–
		85.00	91.146	157.500	√	–	√	–
1600x1200	1600x1200	60.00	75.000	162.000	√	–	√	–
1680x1050	1680x1050	59.94	69.830	164.240	√	–	√	–
1920x1080	1920x1080	47.95	56.821	150.007	√	–	√	–
480/60i	720x487	59.94	15.734	13.500	–	√	√	√
480/60p	720x483	59.94	31.469	27.000	√	√	√	–
576/50i	720x576	50.00	15.625	14.750	–	√	√	√
576/50p	720x576	50.00	31.250	29.000	√	√	√	–
720/50p	1280x720	50.00	37.500	75.250	√	√	√	–
720/60p	1280x720	60.00	45.000	74.250	√	√	√	–
1080/50i	1920x1080	50.00	28.125/31.250	74.250/72.000	√	√	√	–
1080/60i	1920x1080	59.94/60.00	33.716/33.750	74.175/74.250	√	√	√	–
1080/24p	1920x1080	23.98/24.00	26.978/27.000	74.175/74.250	√	√	√	–

**Table 7-2. Supported Signal Timings by Input (continued)**

Format	Resolution	Refresh Rate (Hz)	Horizontal Frequency (kHz)	Pixel Frequency (MHz)	Supported? (√ = Yes, – = No)			
					RGB	Component 1 Component 2	HDMI 1 HDMI 2	Composite S-Video
1080/50p	1920x1080	50.00	56.250	148.500	√	√	√	–
1080/60p	1920x1080	59.94/60.00	67.433/67.500	148.350/148.500	√	√	√	–
NTSC 3.58	–	59.94/60.00	15.734/15.750	3.580	–	–	–	√
NTSC 4.43	–	59.94/60.00	15.734/15.750	4.430	–	–	–	√
PAL-B/G	–	50.00	15.625	4.430	–	–	–	√
PAL-M	–	59.94/60.00	15.734/15.750	3.580	–	–	–	√
PAL-N	–	50.00	15.625	3.580	–	–	–	√
PAL-60	–	59.94/60.00	15.734/15.750	4.430	–	–	–	√
SECAM	–	50.00	13.500	4.250/4.410	–	–	–	√



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